

香港大學理學院 FACULTY OF SCIENCE THE UNIVERSITY OF HONG KONG



Glorious Years Home to Science







The Story Begins Here.....

Science Family as an Oak

ROOT solid foundation of education

TRUNK dense growth rings representing decades of dedication in research

BRANCH alumni reaching out far to contribute to

society

LEAF students as leaves to collect strength

ACORN fruitful acorns sowing seeds for future development

Oak is the chosen gift for 80th anniversary. With its firm foundation and towering noble strength, it shows the ability to endure and grow even in adverse conditions.



Acknowledgements: Calligraphy by Dr Ambrose Shu Fai SO (BSc 1973); Motto by Mr Isaac T C WONG (BSc 198

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FOREWORD AND MESSAGES

The Wisdom and Heritage that Inspire



SUNLIGHT Essential for the growth of our oak

MESSAGE FROM THE PRESIDENT AND VICE-CHANCELLOR



Professor Xiang ZHANG President and Vice-Chancellor

y warmest congratulations to the Faculty of Science for its 80th anniversary celebrations.

Founded in 1939, the Faculty was the first of its kind in the territory, dedicated to equipping its students with the knowledge and abilities to be of service to a steadily developing society. Over the past 8 decades, its faculty members have made important contributions to scientific education and research, and introduced generations of inquisitive young minds in Hong Kong to the wonders of science.

Today's Faculty of Science has grown and been transformed in size and scope, but its forward-looking pioneering spirit remains undiminished. Science is a multifaceted discipline and touches every aspect of our lives, and The University of Hong Kong is strongly dedicated to the advancement of science. I believe we must drive innovation and transform HKU into new dimensions. Exceptional academic scholarship is key, and we aim to strengthen our international standing and grow our collaborations around the world. I am therefore pleased to see the Faculty embracing an ambitious strategic plan that aims to, inter alia, increase the quality and diversity of its scholars, strengthen its teaching quality and enhance research leadership on a global scale.

Going forward, I am confident that the Faculty's teachers will continue to inspire their students with scientific knowledge, and its researchers will continue to make cutting-edge, sustainable research discoveries that will address the needs of our times, enhance our society, and prepare us all for a better future.

On behalf of the University, may I salute the members of the Faculty of Science, past and present, for your loyalty to the University and your commitment to the advancement of science. May this milestone of achievement mark the beginning of further growth and even greater success for the Faculty.

MESSAGE FROM THE **DEAN**

cience is a great human endeavour, first and foremost it is a way (arguably, the way) of discovering how the world works. It does not matter whether your interests lie in sub-atomic particles, the furthest reaches of the universe, the cells in the bodies of animals and plants or the state of the world's oceans — all these subjects can be addressed by science.

Science is an organised body of knowledge constructed by generations of scientists. The professional subjects – medicine and engineering – depend crucially on the work of scientists. Science does not need to define itself in terms of its influence on society, but it does indeed have a great impact. The device on which I am writing this message may have been designed by engineers, but the technology that controls the way it works is science. If you consider how something as simple as the way in which we communicate over long distances has changed in the time that this Faculty has existed. From telegrams, to undersea cables, to satellites; from large cumbersome devices held to the wall by wires operated by a dial, to small hand-held computers you can keep in your pocket. Scientific work has radically changed human communication out of all recognition. And we contribute to this here at HKU, we have people who have changed the way in which the displays of computers and smartphones work by discovering chemical reactions that allow colours to be displayed. We also play our part in understanding the effect that the trade in ivory, sharks' fins, or fish for restaurants, affects the populations of endangered animals in other parts of the world. All of these things are important and all are part of the great range of work that is conducted here in the Faculty of Science. I have the honour of being the current Dean of Science, there have been 18 so far. As such I am simply the current guardian of the Faculty and hope to pass it onto my successors in good shape.

The Faculty is symbolised as an oak tree for this anniversary, over 80 years it has grown and flourished. The different parts of an oak tree all contribute to the life of the tree, in the same way the success of the Faculty depends on the efforts of its staff and students, both past and present. Only by continuing to ensure that we recruit the best talents at all levels and allowing them the freedom to work and to pursue their interests and imagination, will the tree continue to grow vigorously for another 80 years.

Professor Matthew R EVANS Dean of Science

MESSAGE FROM THE CHAIRPERSON OF OAK ANNIVERSARY ORGANISING COMMITTEE



Professor Billy Kwok Chong CHOW

Chairperson of Oak Anniversary Organising Committee; Associate Dean of Science for Development and External Relations "Be like a tree. Stay grounded. Connect with your roots. Turn over a new leaf......Keep growing." – Joanne Rapits

ot long ago we made a heartfelt call to connect alumni from all walks of life across the globe to come together at our Oak Anniversary, celebrating our accomplishments with sincere conviviality. In the blink of an eye, it comes to an epilogue of the year-long celebration. Nonetheless, it does not literally mark a fruitful end of our established connection, instead I would like to encourage all to nurture the blossoms of beautiful new friendships, and to take a brief pause to reflect on what we have built together and set our vision afar for the next decade of developments. In the brief duration of my appointment, I have witnessed first-hand the great power we harness when we put our hearts and minds together to think beyond just ourselves. All it would take is a spark of inspiration. Together we can create beyond the imaginable.

80 years is a long time to learn, share and grow. With the combined efforts of the HKU Science family, we are proud to tell that we now pioneer in diverse disciplines. Spinning wheels on the same thing is never an option for us — we are developing strategies and strengths to go further; for those who fail to take initiatives to spur innovation might eventually hold themselves back from moving forward. We are very much blessed with the unfailing support and philanthropy from our donors and friends, helping us capitalise on opportunities and realise our blueprints. We also owe our warmest gratitude to our alumni, colleagues and students, especially the Steering Committee and Organising Committee for anniversary celebrations. Without their support, the smooth running of our events and campaigns would not have been possible.

Oak tree is a potent symbol of strength and courage. Like a steadfast oak, we stand firm with our solid foundation, produce the strongest type of wood, fine acorns, dense crown and huge shelter. May our oak keep growing and thrive in the years ahead.

A GLANCE AT THE UNIVERSITY AND THE FACULTY

by Times Higher Education (THE)

UNIVERSITY

by Quacquarelli Symonds (QS)



#**H** #I

among the universities in Asia

among universities with great impacts #2

among the universities in Asia

ng the sities in sia

in the world

World-class Rankings of HKU 2019

in the world

WORLD UNIVERSITY RANKINGS QS World University Rankings by Subject 2019 Environmental Sciences #51-100 WORLD UNIVERSITY RANKINGS THE World University Rankings by Subject 2019 #2 Life Sciences

Eminent Subject Rankings in Science Disciplines

Physical Sciences

International Environment

Origins of Our Professoriate Staff

~40% are from overseas

C% North America

% **South America**

Other Asia Countries

Australia & New Zealand



THE Ranking on **Most International Universities 2019**



Hong Kong & mainland China

10



Degrees

2,405 (72.9%) Undergraduates

457 (13.9%) Research postgraduates

435 (13.2%) Taught postgraduates

Total: 3,297

Origins

No. of local students 2,234 (67.8%)

No. of countries for non-local students 38 No. of non-local students 1,063 (32.2%)

Teaching

Graduates No. of graduates ~23,400

Departments

- School of Biological Sciences
- Department of Chemistry
- · Department of Earth Sciences
- Department of Mathematics
- · Department of Physics
- Department of Statistics & Actuarial Science

Research

Research Divisions

- Chemistry Earth & Planetary Science
- Ecology & Biodiversity
- Mathematical & Statistical Science
- Molecular & Cell Biology
- Physics & Astronomy

Research Eminence

- Leads 5 Areas of Excellence (AoE) projects since its inception in 1996
- Established 1 State Key Laboratory (SKL) of Synthetic Chemistry
- **Top-notch Scientists** 16% of our professoriate staff are the world's "Top 1%" scholars, as indicated by Clarivate Analytics' Essential Science Indicators 2018
 - Cumulative number of fellows of foreign academies: 3
 - Cumulative number of Chinese Academy of Sciences (CAS) academicians: 5
 - Cumulative number of State Natural Science Awards: 6

Knowledge Exchange

~ 140 patents were issued for inventions from 2012 – 19

Programmes

- 5 undergraduate programmes
- 7 taught postgraduate programmes

DEANS OF SCIENCE

years of time, Faculty of Science has grown from an acorn to a mighty oak.

Sunlight is the source of energy for plants to grow and thus it is not uncommon to see trees stretching out to where the sunlight is. Indeed, sunlight steers the direction of trees' growth.

Deans of Science are the sunlight of the Faculty. Under their deanships, the Faculty of Science has had clear direction to grow and develop in the past 8 decades. They set the visions far and lead the Faculty to become an important breeding ground for science teaching, scientific research and knowledge exchange. They are devoted to keeping the development of the Faculty ahead

of its time, and on making impacts on wider society.



W D CHESTERMAN DSc. FinstP. FRPS



S C CHAN MSc, PhD, DSc, CChem, FRSC, FRSA



I J HODGKISS BSc, PhD, FLS, CBiol, FIBiol, MIWEM, JP



F C C LEUNG BA, PhD

C K POON BSc(Special), PhD, DSc, CChem, FRSC, JP



K T LEUNG DPhil



M R EVANS BSc, PhD



P CHIU BSc(Hons), MSc, PhD, FRSC

@ 34515511



K F CHENG BSc(Special), PhD, CChem, FRSC

S KWOK BSc, MS, PhD

D S PAYNE BSc, PhD, FRIC, ARCS

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FUN FACTS ABOUT THE FACULTY

1912

at HKU

1939

Professor Walter

BROWN as the first Dean of Science

The first lecturer in Physics Mr A G WARREN arrived



1950

The first postgraduate student was admitted in Science

1941 First meeting of Board of the Faculty of Science



1941-1945

Graduation of Dr Hsing Tsung HUANG (黃興宗), the first and only science student

1952

- SPECTRUM, the first issue of Science Society magazine was published
- The first Science Exhibition was held at Northcote Science Building



1996

Professor Chi Ming CHE from Department of Chemistry was elected as Member of Chinese Academy of Sciences (CAS). He was the **first Hong Kong citizen** being elected to CAS



2007

Introduction of common admission to 6901 BSc programme where students can choose from 14 majors using only **1 programme code**, attracting the largest ever number of JUPAS Band A applicants

1953

The **first MSc graduate** was Mr J B SOUSA from Department of Chemistry

1965

The first doctorate graduate was Mr Alan Tunnard MARSHALL from Department of Zoology

Former Vice-Chancellor and President Professor Lap Chee TSUI endorsing the common admission programme with Science students





attracted over 18,000 visitors, was held at Loke Yew Hall in celebration of Golden Jubilee of the University



4-8th December, 1961 2:00-8:00 p.m.

LOKE YEW HALL CHEMISTRY BUILDING



1942

Wartime degrees were conferred to 2 final year students: Miss Yung Tai LAM (林蓉芽) and Mr Rayson HUANG (黃麗松); HUANG later returned to HKU as Vice-Chancellor

2012

4-year undergraduate degree curriculum was launched under the education reform in Hong Kong

II





2019

Total number of Chinese Academy of Sciences (CAS) Academicians reached 5

2017

The 5-year Plan has been formulated for Faculty's strategic moves, aiming high by targeting a growth of academic staff by 20% and maximising research performance



2017-2018

6 Research Divisions are being established to maximise research performance, identify and nurture research strengths, and incentivise research activities:

Chemistry

Earth & Planetary Science



Ecology & Biodiversity



X+y Mathematical & Statistical Science

Molecular & Cell Biology

Physics & Astronomy



For a tree to become tall it must grow tough roots among the rocks.

Friedrich Wilhelm Nietzsche

FROM TEACHING TO THE COMMUNITY

Nurturing Students and Promoting Science Literacy



ROOT Solid foundation of education Though roots are hidden in the soil, they support the sturdy trunk, dense branches, and wholesome fruits of the tree above. If education can be considered as roots, then perhaps we might better understand how we become the people we are.

For 80 years, the Faculty of Science has provided quality education to generations of students. The nature of education — both the curriculum content and how it is taught — is co-constructed by our students and teachers. "Science education here is learner-oriented. We begin by asking students what their aspirations are, then our job is to create multiple avenues for them to move from peripheral participation to full engagement in their studies. We want to ensure that there are such opportunities in the curriculum, and that the journey itself will bring more pleasure, motivation, and inspiration to their lives," explained Professor Alice Sze Tsai WONG, Associate Dean for Teaching and Learning.

In response to a government policy change, over the last decade, our undergraduate curriculum has been restructured into a 4-year programme. We have leveraged the opportunity to redesign our curriculum to foster experiences that produce future-ready graduates. Efforts have been stepped up to nurture students and provide them with a broader knowledge base and more diverse skills, which will enable them to cross boundaries of disciplines. In addition to programmes focusing on the basic sciences, many new programmes, pathways,

EDUCATION IS THE ROOTS

and specialisations have been introduced to cater for a wide range of pursuits. We also encourage student-initiated learning through increased undergraduate research opportunities and support for experiential learning outside Hong Kong. The aim is to match their interests in the best way possible, and to echo the University's vision of expanding students' horizons, cross-disciplinary thinking, and innovative capabilities, while still demanding excellence in their work.

A new generation of scientists is now emerging. While they are systematic thinkers, they also appreciate the aesthetics of chaos and know how to see connections beyond the purely functional. Our strong roots in careful observation, scientific reasoning, and objective judgement keep us adaptable and innovative.

CHANGING CONTEXT, SAME DEDICATION

We never stop on education innovation. We have been dedicating in enriching students' early research experience. Our next goal is to step up our translational efforts and foster linkage in entrepreneurship.

> Professor Alice Sze Tsai WONG Associate Dean for Teaching and Learning

hanks to globalisation and the unprecedented technological advancements in the past 2 decades, knowledge is now rapidly renewed, intellectual boundaries are more permeable, and professional practices require more complex, multidisciplinary understanding. These are the driving forces behind us keeping the curriculum relevant and up-to-date.

In 2016, the University decisively renewed its vision to focus on the "3+1 Is": "Internationalisation", "Innovation", and "Interdisciplinarity", all converging on "Impact". This partly answers the question of "what's next?" for our science students. By enhancing our curriculum, we will create numerous pathways for students to guide their development as globallyminded citizens, curious innovators, and communicative leaders who will make a positive impact in the world, as well as contribute to social progress.



This will also be achieved by moving to more expansive and flexible undergraduate programmes that prepare students for professional training in a wide range of postgraduate and further education studies. **"We aim at identifying the seamless articulation to widely recognised Master's or Doctoral programmes for all our undergraduate students,"** said Professor WONG. This new vision for teaching and learning will establish a distinctive niche for the Faculty, as well as a point of differentiation for HKU both domestically and internationally. Today, a BSc-plus-MSc model has been formally established for students who want to venture into the Faculty's overseas taught postgraduate programme¹, and a link to the Doctor of Veterinary Medicine programme at The University of Melbourne has also been established, and similar connections are in the pipeline.

Our science education is also underpinned by the understanding that a classroom-based model of teaching and learning is no longer sufficient for our budding scientists. These days, students mix and match learning experiences, course content, and lab practices to prepare themselves for future careers that do not fit squarely within rigid disciplinary boundaries. As such, some students will benefit from lab sessions with mature researchers, while others will require more industry-linked opportunities or collaboration with experts from other faculties. **"We make sure that the keys are there for them to unlock a variety of treasure boxes,"** added Professor WONG. We are therefore committed to making multifaceted learning experiences a top priority.

Naturally, the Faculty never stops, and it attaches great importance to the culture of educational innovation, in terms of depth and breadth. The next big innovative step will see the establishment of the overseas / mainland internship, as well as a Minor in Science Entrepreneurship. These are just some of the systematic measures designed to expose students to real-world industry contexts. Through business analysis of enterprises and other capstone projects, our students will get to grip with trending issues, prevailing attitudes, and various leadership styles.

EXPERIENCING PASSION AND PROFESSION



o many of our students, the world looks totally different after learning science. It is the beginning of curiosity, it opens new doors to develop their intellectual potentials, and it highlights the possibilities of different professions.

Our programme is based around 2 undergraduate programmes², 3 integrated programmes co-offered with other faculties³, and 7 taught postgraduate programmes⁴. Common admission was introduced a decade



by **Mr Harrison Kin Cheung LI** BSc student (major in Food & Nutritional Science)

"University is a place for self-discovery, and to develop an attitude for lifelong learning – without it our lives may not be firmly rooted, our shoots may not soar. A decade ago we heard the future of education was to nurture the strengths of every student. Today, the diversity of learning opportunities, in and out of classroom experiences, flexible cross-faculty major-minor and elective combinations, supportive supervisors, create the freely enquiring mind in me – and without the minds behind the Faculty, I would not be who I am today."

What Our Student Se

ago to give students room to explore their interests before choosing their majors from a list of Science Majors⁵ in different areas. This platter shows our commitment to broadening the mindsets and attitudes of students, which will serve them for a lifetime.

By embedding the concept of interdisciplinarity into our course and programme design such as in the Science Foundation Courses students are provided with an integrated approach to the various scientific disciplines, allowing them to explain a diverse range of phenomena and objects. **"The latest BASc programmes are also an example.** We begin our learning journey with global grand challenges to show why interdisciplinarity is necessary. Learning is then supported by a set of awe-inspiring courses and collaborative exercises freshly co-developed with other faculties," explained Professor WONG. To further highlight the potential of passion and professionalism, we promote a culture of intellectual curiosity, and actively seek and reward students who are willing to experiment through various forms of lab attachment. The Young Scientist Scheme also provides students with early research experience in their first year of study. **"Science must be practised,"** said Professor Pauline CHIU, former Associate Dean for Teaching and Learning. **"You have to see**

HIS SIGN IS ON THE EQUATOR

EQUATOR



by **Mr Jimmy H C MAK** BSc student (major in Biochemistry)

What Our Student Says

"In the Faculty of Science, I have equipped myself with a research mindset, which allows me to see the world differently. A wise professor once told me to be a brat child and ask as many questions as possible – 'Why?' is the question, to seek the truth and uncover the wonders of nature. I finally see the endless boundary of knowledge. I have been appreciating this remarkable legacy of humans, that we have collectively established a huge amount of understanding. However, I reckon there lies a longer journey ahead for us, and I shall be joining with other brilliant intellectuals across the globe, and walk along, step by step." and experience for yourself how learned, general protocols intersect with your lived encounters and discoveries in the lab – sometimes in ways that you may





BSc student (major in Molecular Biology & Biotechnology, minor in Psychology)

"Curiosity may have killed the cat, but it is crucial in life and in scientific research. If you split the word 'research', it becomes 're + search', which implies to search again and again. This indeed reflects the real situation. Scientists need to keep searching for the 'truth', as traditional 'truth' can be overthrown overnight; for instance, Adam Smith's Hundred-Year theory was proven wrong by John Nash, and Galileo found the Earth rotates around the sun and not the other way round. When the 'truth' changes, we need to adapt by being curious and constantly exploring the world. So, be curious, for it is the essence of doing science."

have never thought of before. This is how students get to know the reality and the exceptions, be excited and inspired to discuss findings with others, and grow to see the world through a different lens.

Miss Wing Yan LEUNG

This is also why we have established the Intensive Majors⁶ – to satisfy the needs of the students who want to delve deeply into science and experience all of its dimensions," she added, referring to the new

Studying science is not a mere acquisition of knowledge; it trains the minds of students. The analytical and evidence-based thinking of our graduates will help bring positive changes to our society.



Professor Pauline CHIU Former Associate Dean for Teaching and Learning

option available to undergraduates wanting to specialise in a particular science discipline by taking more of the advanced courses. Furthermore, some of the Intensive Majors come with accreditation from professional organisations⁷.

As a distinguished Faculty with a long history of educational and research excellence, our members have been responsible for making science more relevant to industry and the public in general. One way this has been achieved is through our taught postgraduate programmes, which are extremely popular among those looking for cutting-edge knowledge and career advancement. With this in mind, we ensure that what we offer stays within the focus of various business and industry sectors, such as data science. Together with our revamped undergraduate programmes, the new network of academic programmes provides numerous entry and exit points for students, within an array of professional and research pathways and outcomes.



by **Dr Benoit GUÉNARD** School of Biological Sciences

"University is a defining moment in the life of a person. I see my role as a teacher as not only transmitting knowledge during class, but in disseminating the passion in gaining knowledge for the rest of their life. The best reward as an educator is when meeting former students, they are thankful for opening up their horizon and seeing the world differently."



by **Professor Hoi Fung CHAU** Department of Physics

"One could easily get lost and

forget about our primary teaching goal in this rapidly changing world with new teaching apps and philosophy appearing everyday. And one could easily overlook the gap between what we want students to learn and what they actually learn. Thus I should tell students:

Forget the teaching apps and technology I use. Forget the demos and examples I show. Forget the teaching method I use. Forget me, but not the physics I have taught!"



What Our Teachers Say

by **Dr Janet Kit Yan CHAN** School of Biological Sciences

"CS Lewis once said 'the task of the

modern educator is not to cut down jungles, but to irrigate deserts.' I believe a good teacher encourages imagination and inspires students to achieve beyond what they believe possible."



by **Dr William Man Yin CHEUNG** Faculty of Science Recipient of the Faculty Award for Teaching Excellence 2015-16

"The challenge with education is that teachers cannot learn for the students, but to inspire them. As a teacher I would like to help by sharing with my students ways to fully develop their potential."



by **Professor Wing Sum CHEUNG** Department of Mathematics Recipient of the University Outstanding

"Mathematics is a logical game. It has its own logical structure and convention, and it needs some getting used to. Once we have developed some sense out of it, very soon we would be able to appreciate its intrinsic beauty and usefulness. To learn and master mathematics, the sense or insight or feeling is more important than the sophisticated techniques. In mathematics, detailed and rigorous arguments would easily hinder the understanding of the essential idea behind the scene, and blur the flow of thinking. If a student can put aside the rigour and just go for the ideas, mathematics can be truly enjoyable, fun, and beautiful. So the core of my teaching is to nurture the sense or insight in mathematics."

Teaching Award 2013



by **Dr Jess KING** Department of Earth Sciences and Faculty of Science

"Teaching practical geosciences, we have great fun outdoors facilitating student construction of knowledge by building systematic frameworks, where, although new concepts and problems become more complex, the way in which we activate/apply prior knowledge, our professional instructional scaffolding, stays consistent."



by **Dr Man Hoi LEE** Department of Earth Sciences and Department of Physics

"I have developed and taught courses introducing the perspectives of other planets to Earth Sciences students and geological perspectives to Physics/Astronomy students, as well as all of these areas to all Faculty of Science students. It is most rewarding when students find the broader perspectives inspiring."



by **Dr Yiliang LI** Department of Earth Sciences

"Earth System Science provides a holistic view of global change and the impact of human activities to students."



by **Professor Man Keung SIU** Retired faculty, Department of Mathematics Honorary University Fellow, HKU 2011

"Teaching is to tell a story, a good story which arouses curiosity and excites imagination, a story about the long quest by the human mind for an understanding of the world around us in all respects."



by **Professor Quentin A PARKER** Department of Physics

"I see teaching as a sacred duty of an academic. It is the opportunity to impart to young minds not just knowledge but more importantly to spread understanding, encourage enquiry and critical thinking and, as a scientist, to inculcate an appreciation of the value, importance and power of the scientific method."



by **Dr Angela Pui Ling TONG** Department of Chemistry Recipient of the University Outstanding Teaching Award 2011

"Education deals with people. I enjoy spending my time interacting with students, both inside the classroom and beyond, for academic and nonacademic matters. It is great to see my students develop their potential, and be able to find their ways."



by **Dr Alex WEBB** Department of Earth Sciences

"Roughly half of what we do as scientists is science, and half is communication of science: journal articles, proposals, outreach, etc. Therefore our students learn via a mixture of practice in the scientific method, and practice in disciplinespecific communication."



by **Dr Angela Mai Yan YUEN** Department of Chemistry

"Jean Piaget once said 'to understand is to discover, or reconstruct by rediscovery.' It is my strong belief that it is best for students to learn through experiences, therefore, I encourage students to make connections and rethink their daily experiences with what we are discussing in lectures."



by **Dr Haiyu ZHANG** Department of Mathematics

"As a teacher, I serve as a knowledge

source and a facilitator in the learning process. I place emphasis on attitude and behaviour of students, and believe that instilling intrinsic values such as integrity, courtesy and respect are core and complimentary to develop a positive personality and achieve good learning outcomes."



by **Dr Kam Pui WAT** Department of Statistics & Actuarial Science Recipient of the University Teaching Feedback Award 2017

"Building trust and mutual respect

is crucial in a relationship, even between teachers and students. Teaching and learning is a two-way process which can be strengthened with such relation. Engaging students in this process is a key to success in education."

LEARNING UNBOUND

G iven the diversity of academic pathways, all first year students are assigned an Academic Adviser. There is also an Induction Day to provide more information about the Majors and Minors, and make everything more transparent and accessible to students. However, educational experiences do not come from a variety of programmes and activities alone. A lesson in the greatness of science would be missed if students limit themselves to only following one path in life. We have therefore ensured that our concept of student advice is not only fit-for-purpose but is also liberating.

Dr Francis Chi Chung LING, Associate Dean for Student Affairs, has a clear vision that personal growth should be the primary goal. **"Our broad mission is empowering** students to reflect and see the different frames of reference. We provide them with the encouragement and space needed to get

out of a directionless random walk," he explained.

Student affairs are about helping students to self-reflect, and to get a better understanding of oneself.

> Dr Francis Chi Chung LING Associate Dean for Student Affairs



by Miss Celia Yan Yu YANG BSc student (major in Geology, minor in Biochemistry)



"To sum up my journey here in the Faculty of Science, 'inspiring' would be the best word for it. From universe to earth core, from science logic to communication skills, from having fun to learning hard, all of these are part of this great journey in this Faculty. All the experiences, lessons and opportunities given here have inspired me to be a smarter learner and a more mature person." "Academic regulations would be one frame of reference; personal circumstances would be another. Sometimes we indulge ourselves too much in one frame without noticing our blind spots and misconceptions – our job is to empower students to see and act in ways that fit them better as individuals," said Dr LING, regarding how to turn overwhelming options into an opportunity. After all, a university should be a place that nurtures students' minds, and encourages them to venture out and explore new things for both personal and intellectual development.

FOSTERING APPRECIATION IN SCIENCE

n HKU Science education is not illuminating only to our students, it has the potential to be revealing to the wider community. At the institutional level, the Faculty actively contributes to the university-wide Common Core Curriculum; helping the entire HKU community develop a broader perspective and critical understanding of issues that are fundamentally important to human lives. The Faculty also contributes to the University's initiative of producing Massive Open Online Courses (MOOCs) and mobile learning apps for a global audience. In the near future, we will also further our role in the community by being more visible in addressing "fake science" in popular media.

We remain responsive to the needs of the public, and we deeply understand that interacting with them makes the Faculty more pluralistic in its thinking. For example, mass lectures organised by various Departments will continue to be hosted. In addition, our Junior Science Institute (JSI) now has more than 600 secondary school students taking part each year.

"We have an obligation to engage industries and the public, fully informing them of how we are constantly pushing the frontiers of science, even when many people only focus on the immediate and the functional, and not necessarily the scholarly, pure side of basic science that always looks to understand," urged Professor Pauline CHIU. "Utilitarianism should not be the ultimate aim of research and education. Society needs to embrace the value of science for education and scholarship, and to grow practitioners and students who will be equipped to solve the future needs of the world, and be openminded enough to explore its beauty," she added.

Indeed, at this Faculty, we are no strangers to viewing the world through different lenses and in making discoveries. Not only that, but we are always looking to grow, renew, and innovate. In doing so, we continue to create new avenues for people to explore science and move from peripheral observation to full engagement.

open to

open to explore the beauty of Science

Notes:

- 1. To the Master of Science in Biotechnology at Northeastern University
- 6901 Bachelor of Science (BSc)
 6729 Bachelor of Science in Actuarial Science (BSc(ActuarSc))
- 6224 Bachelor of Arts and Sciences in Applied Artificial Intelligence (BASc(AppliedAI))
 6212 Bachelor of Arts and Sciences (BASc)
 6119 Bachelor of Education and Bachelor of Science (BEd&BSc)
- Master of Science in the field of Applied Geosciences Master of Science in Environmental Management Master of Science in the field of Food Safety and Toxicology Master of Science in the field of Food Industry: Management and Marketing Master of Data Science Master of Statistics Postgraduate Diploma in Earth Sciences
 Major in Biochemistry Maior in Biological Sciences
- Major in Biological Sciences Major in Chemistry Major in Decision Analytics Major in Earth System Science Major in Ecology & Biodiversity Major in Environmental Science Major in Food & Nutritional Science Major in Geology Major in Mathematics Major in Molecular Biology & Biotechnology Major in Physics Major in Risk Management Major in Statistics
 - Major in Chemistry (Intensive) Major in Ecology & Biodiversity (Intensive) Major in Geology (Intensive) Major in Mathematics (Intensive) Major in Molecular Biology & Biotechnology (Intensive) Major in Physics (Intensive)
 - 7. Royal Society of Biology, UK Royal Society of Chemistry, UK The Geological Society, UK

REACHING OUT TO THE PUBLIC



Stephen Hui Geological Museum

The Stephen Hui Geological Museum is the first geological museum of its kind in Hong Kong. Since its opening in 2009, it quickly became a recognised resource for Earth Science education in Hong Kong and the region and has maintained its position as the city's premier

Earth Science gallery. A comprehensive mineral collection from all over the world collected and donated by Dr Stephen HUI forms the core of the Earth Material gallery. The mission of the museum is to inspire an understanding and appreciation of the dynamic natural world of Earth Sciences through an attractive object-based learning laboratory for the nature and evolution of our planet to visitors of all ages.

The Swire Institute of Marine Science



As an off-campus research facility on marine biology situated in the only marine reserve of Hong Kong in the scenic Cape d'Aguilar, the Swire Institute of Marine Science (SWIMS) aims to become an internationally acclaimed marine research centre, and to provide a multidisciplinary research environment, as well as to grow a research culture to train young scientists. It also aspires to foster research collaborations and education links with other marine facilities in the SE Asia and across the globe, and to introduce the wonderful world under the sea to general public.



The Biological Sciences Museum

The Biological Sciences Museum includes one of the richest collections of terrestrial and marine organisms in Hong Kong, with specimens collected since the 1930s from various regions of the world. The preservation of specimens represents an important component of biological research and education, with material used for teaching purpose, outreach and in scientific studies. In urban environments such as Hong Kong, the exhibition of different life forms unveiling the diversity of animals and plants is paramount to raise awareness on conservation and environmental issues faced by a growing number of species.



Milestones

on Teaching



2019

Introduced a host of new initiatives in the undergraduate curricula:

 Co-offered 2 interdisciplinary Bachelor of Arts and Sciences programmes

HKSAR ERA (1997 – TODAY)

 BASc and BASc in Applied Artificial Intelligence with other faculties

- Opened up the option of Intensive Majors for students who would like to specialise in a particular discipline
- Bridged articulation pathways to widely recognised postgraduate programmes at both HKU Science and renowned universities overseas
- Accreditations from international professional bodies for 4 Majors – Chemistry (Intensive), Ecology & Biodiversity (Intensive), Geology (Intensive) and Molecular Biology & Biotechnology (Intensive)
- Introduced the Minor in Science Entrepreneurship, helping students visualise how training in science bears relevance to the real world



2017

Worldwide launch of the Faculty's first free **Massive Open Online Course** "Dinosaur Ecosystems" has reached a global audience of more than 17,000 from 120 plus countries and was a finalist of the 2018 edX Prize

2018

Launched a new Taught Postgraduate Programme in Data Science

2015

- Added a new Major in Decision Analytics, which was the first of its kind in Hong Kong. The programme integrates computer technologies and statistical techniques to analyse complex data for better decision-making
- World-wide alumni number hit 20,000



2016

Introduced the **Young Scientist Scheme** (**YSS**) in which participants were guaranteed research mentorship, exchange experience and Overseas Research Fellowship (ORF)



2012

- Curricula reform due to transition from 3-year curriculum to the 4-year one
- Introduced a 1-year core sequence of Science Foundation Courses, one on Scientific Method and Reasoning and the other on the Fundamentals of Modern Science
- Established the **HKU Science Outreach Team**, a student-led organisation to promote science literacy among the general public



2010

Began offering courses in the **Common Core Curriculum** to support the University's goal in cultivating a broader perspective for HKU students 2008

Launched the Talk@MySchool Programme and Campus Visit to reach out to more local schools



• Official launch of **Stephen Hui Geological Museum** made possible through the generous support by the family of the late Dr Stephen Sze Fun HUI



Environmental Science field course

 Started offering a new Major in Environmental Science, the first interdisciplinary major in the Faculty

2007

 Implemented Faculty Common Admission where students are admitted to the Faculty and have 1 year to explore various subjects before committing to a major

 Established the Overseas Research Fellowship (ORF) and the Summer Research Fellowship (SRF) Schemes, providing financial support to students who opted to join overseas laboratories or institutes or to do research in a supervisor's laboratory in the Faculty

 Academic Advising System was set up to explore different academic options with students, and co-construct roadmaps with them

 Formation of School of Biologcal Sciences through the merger of 3 departments: Biology, Ecology & Biodiversity and Zoology

• Experiential Learning became a graduation requirement for BSc programme



2005

vear

Number of Bachelor

of Science graduates

surpassed 400 each

2002

Launched the **Summer Science Institute** (SSI), which later on became the Faculty's flagship enrichment programme Junior Science Institute (JSI)



1998

Introduced the creditunit system to replace the unit system (also known as the "paper" in the University) .





2006

Introduction of Major and Minor

System in BSc programme to allow student choices of major-minor from Science and courses offered by Faculties of Arts, Business and Economics, Education, Engineering, and Social Sciences

2004

Department of Statistics & Actuarial Science joined the Faculty of Science

2000

Kadoorie Biological Sciences Building opened with the support of Kadoorie Family



MODERN ERA (1980 – 1996)

Early 1990s

- Accelerated expansion of tertiary education in Hong Kong due to its rapid economic growth, and the need for more university-trained professionals
- The number of Science undergraduates reached up to 840 each year



Earth Sciences Unit became the Department of Earth Sciences

1989

HKU Science Alumni Association founded



1983

Shaw Buildings were completed, and they are currently home of Department of Mathematics and Department of Statistics & Actuarial Science

1981

Hui Oi Chow Science Building opened



1994

- Department of Ecology & Biodiversity was established
- Chong Yuet Ming Chemistry and Physics Buildings completed and opened



1982

Science Building opened, and is currently home of Department of Earth Sciences

Last organic chemistry practical in the first-floor teaching laboratory of the old Chemistry Building before its relocation to the Chong Yuet Ming Chemistry Buildina

James Hsioung Lee

1980

The number of Science undergraduates reached 650 each year



POST-WAR PERIOD (1946 – 1979)



-

1973

5.

Knowles Building (where Department of Mathematics was housed then) opened

1965

Conferred the first Doctorate Degree to Mr Alan Tunnard MARSHALL from the Department of Zoology

1979

The 4-year programme was abolished

1967

- The Radioisotope Unit was set up
- Department of Statistics & Actuarial Science was established; which later joined the Faculty of Science in 2004

1972

The unit structure (also known as "paper"), in which students had to make a minimum of 8 courses or units, was introduced

1961

Attracted over 18,000 visitors to the third Science Exhibition, which was held at Loke Yew Hall for the celebration of Golden Jubilee of the University

1959

- 3-year pass degree renamed as BSc (General) degree
- 4-year honours degree renamed as BSc (Special) degree

Science Society group photos





1963 - 1964

1958

- Department of Biology was split into 2 departments: Department of Botany and Department of Zoology
- Preliminary Science course was abolished with the improved standard of Advanced Level Matriculation Examination



1953

- The first post-war graduate Mr J B SOUSA from Department of Chemistry was awarded his MSc Degree
- Chemistry Building opened, later renamed as Hui Pun Hing Building



1951

Honours classification was introduced; Honours degree and master's degree courses were subsequently formed

1950

Admitted the first postgraduate student in Science



1952

- The pre-war first year programme was restructured into a Preliminary Science course. Successful completion of this course served as an entry qualification for studying in the Science, Medical or Engineering Faculties
- The Fisheries Research Unit was formed under the Department of Biology. A 66-foot diesel-powered steel research vessel called "Alister Hardy" was built

1946

The University reopened in 1946 and the teaching of Science was a top priority as there was a great demand to train doctors and engineers



1946 - 1947

Professor D F DAVIES from Physics played a key role in the rehabilitation of the Faculty of Science and the University after the war

THE BEGINNING (1911–1945)



1942

Wartime degrees were conferred to 2 final-year students: Miss Yung Tai LAM (林蓉苐) and Mr Rayson HUANG (黃麗松); HUANG later returned as the Vice-Chancellor of the University in the 1970s

Professor Rayson HUANG as Vice-Chancellor of HKU

1941

Northcote Science Building opened on Pokfulam Road. Physics occupied the ground floor; Chemistry, the second; and Biology, the third



1939

 Faculty of Science founded with 4 Departments: Biology, Chemistry, Mathematics and Physics X+Y

 Professor Walter BROWN was named the first Dean of Science. He is still remembered through the annual Walter Brown Memorial Prize in Mathematics



1941 – 1945

- Interrupted by the outbreak of war, the University suspended its teaching and research activities
- Graduation of the first and only student in the Bachelor of Science Programme: Mr Hsing Tsung HUANG (黃興宗; in the middle), who was also the Founding Chairman of Science Society in 1940



1940 Science Society founded

1938

Mr Rayson HUANG was admitted to the Faculty



1928

Biology Building opened near the University main entrance

1930

Pak Mi HUI (許百眉) became the first student to complete the 4-year Science degree programme in the Faculty of Arts



1912-1939

Science subjects offered in Faculty of Arts to Medical Engineering and Arts students. The 2 streams of studies were (a) Experimental Sciences; (b) Science subjects for Mathematics and Science teachers; comprising 4 pure science subjects: Chemistry, Mathematics (Pure and Applied), and Physics

1914

The Department of Physics was established in 1914



1912

- First lecturer in Physics Mr A G WARREN arrived at the University
- Subjects of Pure and Applied Mathematics, Physics and Chemistry were offered in the 1910s

1918

Professor Walter BROWN was appointed as Chair in Mathematics

There are many branches of learning, but only the one solid tree-trunk of wisdom.

Henry S Haskins

FROM LABORATORY TO APPLICATION

Research Highlights and Knowledge Transfer



TRUNK Dense growth rings representing decades of dedication in research



NOVEL RESEARCH PAVES THE ROAD FOR CREATIVE SOLUTIONS

At the Faculty of Science, research is built around knowledge discovery — we do not jump on every new fad in the science community. We are trying to create a long-term research agenda with a vision of what holds the tree of knowledge together. When the trunk is strong, branches reach out more widely and healthily into new spaces.

Research is a process of knowledge creation, and ultimately it creates impact.

Professor Matthew R EVANS Dean of Science Not only does the Faculty have a fondness for bold experiments, it also has a passion for core innovation. Today, it is home to 4 current members of the Chinese Academy of Sciences (CAS), and the same number of members of overseas science academies, it is a partner in the State Key Laboratory (SKL) of Synthetic Chemistry, and is involved in 5 Areas of Excellence (AoE) projects with international and inter-institutional collaborations. The Faculty also partners with CAS in 3 HK-CAS Joint Laboratories in Chemical Geodynamic, Chemical Synthesis, and New Materials. Furthermore, research divisions are being established to better facilitate collaborative research across disciplines. Upgrading the infrastructure is also a priority for the Faculty, as we understand the importance of meeting the demands of researchers working on high-impact projects.

"Research and teaching are our foundations. We strive for excellence in both, and take the lead in being a pioneer of knowledge exchange. We endorse the belief that science creates impact," said Professor Matthew R EVANS, Dean of Science.

A NEW BREED OF RESEARCH DRIVEN BY INNOVATION

rofessor Aleksandra DJURIŠIĆ, Associate Dean for Research and Graduate Studies, saw high-impact research in two different dimensions. **"It could mean making an impact within a research community, and it could also be research that has substantial effects on society, such as product development, policy advocacy, or bringing about a change in attitude in society,"** she explained.



Aspiring to achieve impacts in both, the imminent task is to build a critical mass in specific areas of strength, so that the Faculty has a stronger capacity to address bigger challenges at the global level. In light of the 80th Anniversary, worldwide recruitment of Assistant and Associate Professors has been launched. Increasing the academic staff population by 20% through competitive remuneration and starting packages is also part of the Faculty's 5-year roadmap. The newly introduced "Research Division" structure also intends to position us to deal better with the changing landscape of the science community. **"They will be flexible, open-ended gatherings defined in relation to the evolving research ideas that our scientists pursue,"** Professor DJURIŠIĆ anticipated.

The newly introduced Research Divisions boost interdisciplinarity, which empowers us to tackle bigger local and global challenges.

> Professor Aleksandra DJURIŠIĆ Associate Dean for Research and Graduate Studies



"We believe that this plan will place the Faculty on the trajectory to be global elite. Our subjects will be rated among the best in the global arena, we will have tangible benefits derived from improved Research Assessment Exercise (RAE) scores, and the heightened popularity will make us a destination for high quality staff and international students from around the world," added Professor EVANS.

The primary goal has always been core innovation. **"By core innovation, I mean research that becomes a reality in a multitude of application scenarios and contributes to the development of a nation,"** explained Chi Ming CHE, Zhou Guangzhao Professor of Natural Sciences. Professor CHE is also the Director of State Key Laboratory (SKL) of Synthetic Chemistry, and the first Hong Kong recipient of the First-Class Prize of China's State Natural Science Award. Established in 2010, SKL has won high praise for its robust and quality research work. **"SKL focuses on Synthetic Chemistry and has a strong underpinning in basic research and blue-sky research. There is also a strong emphasis on cross-disciplinary applications, since the creation of a wide range of new materials, as well as cleaner or 'greener' chemical processes, are highly dependent on chemical syntheses." Indeed, SKL and Professor CHE's team have been producing fascinating results in a wide range of fields — partnering with institutions in Hong**

Kong, mainland China, and around the world.

Research needs to be broad yet simultaneously be focused; vision is thus crucial for doing Science and bringing it to next level.

Professor Chi Ming CHE Zhou Guangzhao Professor of Natural Sciences



CROSSING BOUNDARIES

nitiatives designed to foster collaborative research and interdisciplinarity have been a mainstay for many years now in the Faculty. "We see a unique opportunity for us in our upcoming project of developing the InnoScience Hub – the central research facilities at the Tech Landmark of No. 2 University Drive. Outfitted with state-of-the-art equipment, it is an important hub where faculties and postgraduate students can exchange novel ideas, and where translational and interdisciplinary research can take place. We envisage it as a strong link connecting us with industry, where we can derive value from our research deliverables." Dean EVANS explained. "We foresee that interdisciplinary innovation will go beyond the traditional boundaries of science and create knowledge 'outside the box'. The InnoScience Hub is a perfect platform for this."

The prelude to these wide-ranging efforts has been most encouraging. In 2018, a gift of HK\$3.2 million was received from TCL Corporate Research (Hong Kong) Co. Ltd. (TCL) to launch the "TCL Innovative Research Fund for Science 80th Anniversary". This scheme supports 10 PhD students to develop innovative research projects in biomedical science, big data analytics, artificial intelligence, and material science for 4 years. The research outputs from these projects are expected to be applied to daily life, as well as foster societal advancement.

STRONGER REGIONAL AND INTERNATIONAL PRESENCE

an ever-evolving body of knowledge. skills, and methods, designed to explain both the seen and unseen, research reminds us of the pluralistic vision of the world. It also motivates us to explore through regional and international collaborations.

The HKU-Zhejiang Institute of Research and Innovation (HKU-ZIRI) in Hangzhou will be the second home of our Laboratory for Space Research (LSR). Our physical presence in HKU-ZIRI greatly facilitates our engagement with prominent partners, such as the School of Astronomy & Space Science at Nanjing

10.00

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University and the Beijing Institute of Space Mechanics and Electricity. Such collaborations open up the new opportunity to launch the "NJU - HKU No.1 Satellite" - an X-ray astronomy telescope with a focused primary science goal to search for dark matter in massive nearby galaxy clusters. "This exciting development will help turbo charge the collaborations and opportunities for our Hong Kong-based scientists with top researchers in mainland China. Faculties are encouraged to engage more fully in ZIRI. Anything we do in ZIRI should be sustainable," remarked Dean EVANS.

Unprecedented opportunities are arising from the development of the Greater NUMBER OF STREET A REALIZED STATISTICS Bay Area vision. "A stronger presence across the border will help us to utilise all the opportunities available. Working closely with the Senior Management Team of the University, we are keen to further explore how we may 34.75 collaborate with partners in HE RE 10 10 10 10 10 the mainland, as well as other 15 24

international locations," Professor DJURIŠIĆ said. Such collaborations promote diverse and quality research, which reflects our status as a comprehensive Faculty.

Internationally, our researchers are recognised as having significant influence. According to the Clarivate Analytics' Essential Science Indicators 2018, 16% of our professoriate staff are among the world's "Top 1%" of scholars. Moreover, 5 of our academics were listed as "Highly Cited Researchers 2018" among the world's top scientists. The list comprises scientists from around the world whose studies were among the most referenced top-tier research studies in their respective fields.

By reaching out, we are able to benchmark ourselves against the world's best and raise our standards. When we partner with other institutions, we are also able to broaden the impact of our work - this is how we move with the times.

RELENTLESSLY FOCUSING ON SCIENCE

PAY IT FORWARD

ur endeavours in new initiatives do not distract us from the core of science scholarship. "Some might question the need for the development of basic research in Hong Kong. In fact, our Faculty has a long tradition of conducting research even at times when funding and facilities were limited, and has laid its roots in striving for excellence in basic research. I believe there is a bright future so long as one stays focused and determined, insisting on standards and excellence, and be creative and innovative,"

remarked Professor Vivian Wing Wah YAM, our renowned chemist and Philip Wong Wilson Wong Professor in Chemistry and Energy. The Faculty's success is based on our scientists being on a different time-horizon to others. Most of us do not work for outcomes defined by others, nor do we just work as followers or jumping on the bandwagon. Rather, we relentlessly focus on the seeking of the truth and new knowledge driven by curiosity. To that end, we ensure that our researchers are well supported for the decade ahead.



he world is ever-changing and the pace of modern life does not look as though it will slow down anytime soon. While always striving to maintain our pioneering position, the Faculty also builds upon its strengths in basic and applied sciences, sharpens its unique edge in increasing fundamental knowledge, and creates new frontiers and technologies which lead to new applications. In doing so, we aim to create significant impacts across all fields.

"I always tell my students that as scientists, one should be openminded and open to criticisms. One should take critical comments made by peers in a positive way, which a lot of times can be constructive. **K** Research requires the freedom of mind and room to test and demonstrate innovative ideas and to pursue dreams. Professor Vivian Wing Wah YAM

After all, if one can address the critical comments made or at least make an effort trying one's best to

address them with more experimental evidence, the body of work will become more enriched and solid. Rigorous solid science should be able to withstand challenges. One should explore the many different possibilities and options, and try to verify them with experiments. Even a negative result can be used as a useful piece of information and as a clue to rule out certain options or to guide one from not making the same mistake or tackling from the same direction. This is how one can harness both the benefit of hard work and serendipity," addressed Professor YAM.

Philip Wong Wilson Wong Professor in Chemistry and Energy

RESEARCH PROMINENCE

HEALTH@INNOHH

The Laboratory for Synthetic Chemistry and Chemical Biology

The laboratory is a 5-year programme led by Professor Chi Ming CHE from the Department of Chemistry, in collaboration with Imperial College London and Peking University. The project aims to produce innovative, high-impact and leading-edge interdisciplinary research in the area of drug discovery and development. It has been admitted to the Health@InnoHK programme launched by Innovation and Technology Commission (ITC), HKSAR with a projected funding of HK\$500 million and a laboratory area of 12,000 sq.ft. in Hong Kong Science Park.

The Centre of Machine Learning for Energy Materials and Devices

The Centre is a multi-disciplinary programme which combines big data/ machine learning, computational science and experiment to discovery new energy materials and devices, in particular, organic light emitting diodes and solid state lithium ion battery. Professor Guanhua CHEN from Department of Chemistry is the Lead Principal Investigator. It has been admitted to AIR@InnoHK programme launched by Innovation and Technology Commission (ITC), HKSAR with a projected funding of up to HK\$ 500 million over a five-year period and a lab space of 12,000 sq.ft. in Hong Kong Science Park.

State Key Laboratory (SKL) of Synthetic Chemistry

This SKL aims to create or identify novel chemical entities with important applications, and to devise and develop environmentally friendly methods for the synthesis of chemical entities. Its mission is to develop research programmes that would bring research areas on functional molecular materials and chemical biology together, and to use the complementary expertise of these two areas in a synergistic way. The laboratory makes use of improved metal catalysis technology for construction of organic compounds with high efficiency and selectivity. It focuses on the design and synthesis of metal catalysts for organic transformations in drug discovery and materials synthesis, with emphasis on the development of catalysts for environmentally benign and green transformations, particularly, in the activation of small molecules and selective functionalisation of saturated hydrocarbons. Cumulative number of Research Grants Council (RGC)'s



Areas of Excellence (AoE) projects directed by HKU investigators since its inception in 1996:

2017 Chemical Biology Approach to Molecular Medicine

Coordinated by Professor Dan YANG, this AoE was established to build up chemical biology research platforms to understand fundamental biological processes (such as post-translational modification and oxidative stress) at the molecular level, and to develop novel therapeutic approaches to human diseases.

2014 Marine Environmental Research and Innovative Technology

This AoE was awarded funding and established to conduct research to develop innovative technologies for early detection, assessment, prediction and control of impacts arising from hypoxia (low oxygen), endocrine disrupting chemicals (EDCs) and emerging chemicals of concern (ECCs) in the marine environment. The project was directed and led by Professor Rudolf WU, in collaboration with 5 other local universities.

2010 Molecular Functional Materials

Coordinated by Professor Vivian Wing Wah YAM, this AoE brought together inter-institutional efforts from the area of synthetic, polymer, material and physical chemistry, and interdisciplinary expertise through national/ international collaboration in physics and device engineering towards developing an internationally eminent research centre in the area of molecular functional materials towards addressing energy-related issues.

Theory, Modelling, and Simulation of Emerging Electronics

Coordinated by Professor Fuchun ZHANG, this AoE developed next generation multi-scale electronic design automation (EDA) tools that combine the atomistic simulation of individual devices, the coarse-grained modelling of integrated circuitries and simulation of electric signals propagation and interference.

2001 Molecular Technology for Drug Discovery and Synthesis

Cumulative number

of State Natural

Science Awards:

Co-ordinated by Professor Chi Ming CHE, this AoE was awarded funding and established to combine the expertise of leading academics with high international repute in chemistry and life sciences. The mission was to implement world-class science and technology in the area of drug discovery and synthesis.

Top-ranked Scientists

• According to Clarivate Analytics' Essential Science Indicators 2018, of our professoriate staff are the world's Top 1% scholars

> Cumulative number of fellows for foreign national academies of sciences:

- Cumulative number of Chinese Academy of Sciences (CAS) academicians:
- Number of founding members/ members of Hong Kong Academy of Sciences:

Milestones

on Research

HKSAR ERA (1997-TODAY)

2019

• 6 Research Divisions are being established with new Research Division Directors recruited globally, to facilitate and enhance research performance



- Professor Chi Ming CHE (Department of Chemistry) has secured a projected funding of HK\$500 million for the Laboratory for Synthetic Chemistry and Chemical Biology from Innovation and Technology Commission, HKSAR
- Professor Guanhua CHEN (Department of Chemistry) has secured a projected funding of HK\$500 million for the Centre of Machine Learning for Energy Materials and Devices from Innovation and Technology Commission, HKSAR



Professor Andy HOR (Department of Chemistry) has been elected as Fellow of the European Academy of Sciences



Dr Xiang David LI (Department of Chemistry), Dr Jin WU (School of Biological Sciences) and Dr Binzheng ZHANG (Department of Earth Sciences) were awarded the Excellent Young Scientists Fund under the National Natural Science Foundation of China



- Professor Ngai Ming MOK (Department of Mathematics) was elected as Fellow of American Mathematical Society, USA
- Professor Wang YAO (Department of Physics) was awarded the Croucher Foundation Senior Research Fellowship
- · Dr Moriaki YASUHARA (School of Biological Sciences) was awarded the 20th Biwako Prize for Ecology jointly by the Government of Shiga Prefectural and the Ecological Society of Japan
- Professor Guochun ZHAO (Department of Earth Sciences) was elected as Member of Chinese Academy of Sciences, China



2018

- Professor Xuechen LI (Department of Chemistry) was awarded the Croucher Foundation Senior Research Fellowship
- Professor Jeff Jianfeng YAO (Department of Statistics & Actuarial Science) was elected as Fellow of Institute of Mathematical Statistics



Professor Xiaoming YUAN (Department of Mathematics) was awarded the Higher Education Outstanding Scientific Research Output Award (Second-class Prize) from the Ministry of Education, China

- Professor Guochun ZHAO (Department of Earth Sciences) received The World Academy of Science (TWAS) Prize in Earth, Astronomy and Space Sciences
- Professors Guochun ZHAO and Min SUN (Department of Earth Sciences) received the First-class Prize of the Natural Science Award from the Ministry of Education, China (Co-winners)
- The University identified 4 Strategically Oriented Research Themes (SORTs) in the Faculty, namely: Chemical Biology for Drug Discovery, Functional Materials for Molecular Electronics, Two-Dimensional Materials and Sustainable Urban Water Environment. Avenues for translating this research into impact are being developed
- Set-up of the Laboratory for Space Research (LSR) at HKU-Zhejiang Institute of Research and Innovation (HKU-ZIRI)







2017



- Professor Chi Ming CHE (Department of Chemistry) received the Ryoji Noyori Asian Chemical Editorial Society Award
- Professor Xiaodong CUI (Department of Physics) was awarded the Croucher Foundation Senior **Research Fellowship**

Professor Kenneth Mei Yee LEUNG (the Swire Institute of Marine Science and School of Biological Sciences) was awarded the 19th Biwako Prize for Ecology jointly by the Government of Shiga Prefecture and the Ecological Society of Japan





Professor Ngai Ming MOK (Department of Mathematics) was elected as Member of Hong Kong Academy of Sciences

Professor Michael Kwok Po NG (Department of Mathematics) received Feng Kang Prize of Scientific Computing and was seleted as a SIAM Fellow

2014

- Professor Guanhua CHEN (Department of Chemistry) was elected as Fellow of American Physical Society, USA
- Professor Wang YAO (Department of Physics) received the 2014 Achievement in Asia Award (Co-winner)





Professors Guochun ZHAO and Min SUN (Department of Earth

Sciences) received the Second-class Prize of the State Natural Science Award from the Ministry of Science and Technology, China (Co-winners)

2016

Professor Guanhua CHEN (Department of Chemistry) was awarded the Croucher Foundation Senior Research Fellowship



- Professor Guochun ZHAO (Department of Earth Sciences) received the First-class Prize of Khwarizimi International Award
- · Establishment of the Big Data Research Cluster (BDRC)
- · Launch of the Laboratory for Space **Research (LSR)**



- Professor Chi Ming CHE (Department of Chemistry) was elected as the Founding Member of Hong Kong Academy of Sciences
- Professor Ngai Ming MOK (Department of Mathematics) was elected as Member of Chinese Academy of Sciences, China



Professor Vivian Wing Wah YAM (Department of Chemistry) was elected as the Foreign Member of the Academia Europaea and the Founding Member of Hong Kong Academy of Sciences, and received the Ludwig Mond Award by the Royal Society of Chemistry, UK





Professor Tony Wing Kam FUNG (Department of Statistics & Actuarial Science) was elected as Fellow of American Association for the Advancement of Science (AAAS), USA

Professor Alice Sze Tsai WONG (School of Biological Sciences) was awarded the Croucher Foundation Senior Research Fellowship



Professor Vivian Wing Wah YAM (Department of Chemistry)



was elected as Member (Foreign Associate) of the National Academy of Sciences, USA; she was also a recipient of the L'Oréal-UNESCO For Women in Science Awards (Asia-Pacific Laureate)

The RGC-supported theme-based research

on "Challenges in Organic Photo-Voltaics and Light Emitting Diodes – A Concerted Multi-Disciplinary and Multi-Institutional Effort" was awarded HK\$57.4 million of funding to address energy issues for the development of a sustainable environment



2013



Professor Chi Ming CHE (Department of Chemistry) received the Royal Society of Chemistry Centenary Prize, UK, and was elected as Member (Foreign Associate) of National Academy of Sciences, USA



Professor Wai Ki CHING (Department of Mathematics) was awarded the Higher Education Outstanding Scientific Research Output Award (Second-class Prize) from the Ministry of Education, China



Professor Zidan WANG (Department of Physics) received the Second-class Prize of the State Natural Science Award from the Ministry of Science and Technology, China (Co-winner)

Professor Guosheng YIN (Department of Statistics & Actuarial Science) was elected as Fellow of American Statistics Association, USA







· Professor Tony Wing Kam FUNG (Department of Statistics & Actuarial Science) was elected as Fellow of Institute of Mathematical Statistics, USA: he also received the Second-class Prize of the Natural Science Award from the Ministry of Education, China



Professor Ngai Ming MOK (Department of Mathematics) received the Bergman Prize of the America Mathematical Society, USA

- Professor Jian WANG (Department of Physics) was awarded the Croucher Foundation Senior Research Fellowship
- HKU is one of the 6 collaborating local universities for the State Key Laboratory in Marine Pollution (SKLMP), established in 2009 and hosted by City University of Hong Kong. The mission of the SKLMP is to protect the marine environment of Hong Kong and South China by identifying major threats such as algal toxins and contaminants of emerging environmental concern, and developing tools and technologies to address and solve these problems

2008

 Professor Guanhua CHEN (Department of Chemistry) received the First-class Prize of the Natural Science Award from the Ministry of Education, China (Co-winner)



 Professor Tony Wing Kam FUNG (Department of Statistics & Actuaria) Science) was awarded the Croucher Foundation Senior Research Fellowship

2010



- Professor Godwin Kwong Yu CHAN (Department of Chemistry) was awarded the Croucher Foundation Senior Research Fellowship
- Professor Shunging SHEN (Department of Physics) was awarded the Croucher Foundation Senior Research



Fellowship





- Professor Dan YANG (Department of Chemistry) received The World Academy of Sciences (TWAS) Prize in Chemistry
- **Professor Wenan ZANG** (Department of Mathematics) was awarded the Outstanding Research Achievement Award, Academy of Mathematics and Systems Science, CAS
- · The State Key Lab of Synthetic Chemistry was established



合成化学 **m**重点实验室 大学伙伴实验室) natory of Synthetic Chemistry at in The University of Hong Kong) 中华人民共和同科学技术部

2006





Professor Vivian Wing Wah YAM

(Department of Chemistry) received the Second-class Prize of the State Natural Science Award from the Ministry of Science and Technology, China







2007

antes

Professor Chi Ming CHE (Department of Chemistry) was elected as Fellow of The World Academy of Sciences (TWAS)

Professor Chi Ming CHE (Department of Chemistry) received the First-class

Hall of the People in Beijing. He was the first Hong Kong scientist to win this

Chemistry

Statistics, USA

of Sciences (TWAS)

Prize of the State Natural Science Award from Premier Jiabao WEN in the Great

award; he was also awarded The World Academy of Sciences (TWAS) Prize in

Professor Kwong Sang CHENG (Department of Physics) was

Professor Wai Keung LI (Department of Statistics & Actuarial

Science) was elected as Fellow of the Institute of Mathematical

Chemistry) was elected as Fellow of The World Academy

Professor David Lee PHILLIPS (Department of Chemistry) was

awarded the Croucher Foundation Senior Research Fellowship

elected as Fellow of the American Physical Society, USA

Professor Vivian Wing Wah YAM (Department of



- Professor Mee Len CHYE (School of Biological Sciences) was awarded the Croucher Foundation Senior Research Fellowship
- Professor Ngai Ming MOK (Department of Mathematics) received the Second-class Prize of the State Natural Science Award from the Ministry of Science and Technology, China
- Professor Zidan WANG (Department of Physics) was awarded the Croucher Foundation Senior Research Fellowship





2004

Professor Billy Kwok Chong CHOW

(School of Biological Sciences) was awarded the Croucher Foundation Senior Research Fellowship



2002



- Professor Kwong Sang CHENG (Department of Physics) received the First-class Prize of the Natural Science Award from the Ministry of Education, China (Co-winner)
- Professor Will Wai Ming LEE (Department of Zoology) was awarded the Croucher Foundation Senior Research Fellowship



- Professor Zidan WANG (Department of Physics) received the First-class Prize of the Natural Science Award from the Ministry of Education. China (Co-winner)
- Professor Wing Tak WONG (Department of Chemistry) was awarded the Croucher Foundation Senior Research Fellowship

2001

- Professor David Shuk Yin TONG (Department of Physics) was elected as the American Physical Society Fellow
- · Professors Vivian Wing Wah YAM (Department of Chemistry) and David Shuk Yin TONG (Department of Physics) were elected as Members of the Chinese Academy of Sciences, China
 - Professor Dan YANG (Department of Chemistry) was awarded the Croucher Foundation Senior Research Fellowship

1999



- Inauguration ceremony took place in Peking University to celebrate the establishment of the Joint Laboratory in Rare Earth Materials and **Bioinorganic Chemistry**
- Professor Jian WANG (Department of Physics) received the 1999 Achievement in Asia Award (Co-winner)

2003

Professor Kwong Sang CHENG (Department of Physics) received the Second-class Prize of the State Natural Science Award from the Ministry of Science and Technology, China (Co-winner)



Professor Wai Keung LI (Department of Statistics & Actuarial Science) was elected as Fellow of American Statistical Association, USA; he was also awarded the Croucher Foundation Senior Research Fellowship

Department of Microbiology from Faculty of Medicine worked closely

The Department of Zoology from the Faculty of Science and the

to undertake research about SARS coronavirus



125

2000

- Professor Kwong Sang CHENG (Department of Physics) was awarded the Croucher Foundation Senior Research Fellowship
- Professor David DUDGEON (School of Biological Sciences) was awarded the 10th Biwako Prize for Ecology jointly by the Government of Shiga Prefecture and the Ecological Society of Japan



 Professor Vivian Wing Wah YAM (Department of Chemistry) was awarded the Croucher Foundation Senior Research Fellowship



MODERN ERA (1980–1996)



1997

Professor Chi Ming CHE (Department of Chemistry) was awarded the Croucher Foundation Senior Research Fellowship

• Professor David Shuk Yin TONG (Department of Physics) was awarded the

Croucher Foundation Senior Research Fellowship

1996

With the establishment of the HKU-CAS Joint Laboratory on New Materials, started a new theme of multidisciplinary collaborative research with the Chinese Academy of Sciences on the design and application of advanced molecular and layered materials with targeted electro-optical, chemical, physical and magnetic properties

1990

Swire Marine Laboratory in Cape d' Aguilar opened to advocate marine conservation under the leadership of Emeritus Professor Brian MORTON; the Laboratory later renamed as the Swire Institute of Marine Science



1998

• **Professor Ngai Ming MOK** (Department of Mathematics) was awarded the Croucher Foundation Senior Research Fellowship





Agreement was signed at the Shanghai Institute of Organic Chemistry to establish the Hong Kong-Shanghai Joint Laboratory of Chemical Synthesis

The Institute of Mathematical Research was set up

1995

 Professor Chi Ming CHE (Department of Chemistry) was elected as Member of the Chinese Academy of Sciences, China

1986

The **Kadoorie Agricultural Research Centre** at Shek Kong opened, which later led a leading position in conducting research in agriculture, horticulture and environmental science related issues in the region, under the leadership of Professor Daniel Kwong On CHAN

ENDOWED PROFESSORSHIPS IN THE FACULTY



Edmund and Peggy Tse Professorship in Mathematics (Professor Ngai Ming MOK, Department of Mathematics)



Norman and Cecilia Yip Professorship in Bioinorganic Chemistry (Professor Hongzhe SUN, Department of Chemistry)

Morningside Professorship in Chemical Biology (Professor Dan YANG, Department of Chemistry)



Patrick S C Poon Professorship in Statistics and Actuarial Science (Professor Guosheng YIN, Department of Statistics & Actuarial Science)

Philip Wong Wilson Wong Professorship in Chemistry and Energy (Professor Vivian Wing Wah YAM, Department of Chemistry)



Wilson and Amelia Wong Professorship in Plant Biotechnology (Professor Mee Len CHYE, School of Biological Sciences)



Zhou Guangzhao Professorship in Natural Sciences (Professor Chi Ming CHE, Department of Chemistry)

OUR RESEARCH STRENGTHS

We are establishing 6 Research Divisions to enhance our research strengths:

Chemistry Earth & Planetary Science Ecology & Biodiversity Mathematical & Statistical Science Molecular & Cell Biology Physics & Astronomy

X+1

Biological Sciences

School of Biological Sciences (SBS) was founded in 2007 following the merger of the Departments of Zoology, Botany, and Ecology & Biodiversity. Currently, SBS comprises 40 professoriate staff, 35 postdoctoral fellows, 164 research students, and a team of 35 technical and

administrative staff. According to the 2019 QS World University Rankings by Subject, HKU's performance in Biological Sciences, Environmental Sciences and Earth & Marine Sciences – which are the subjects in which our colleagues publish – were, respectively, ranked the 48th, 51st, and 41st in the world, and the 8th, 7th, and 3rd in Asia.

> Research efforts and strengths in SBS are centred around 2 equally sized Research Divisions: (1) Molecular & Cell Biology and (2) Ecology & Biodiversity. Our members

are committed to undertaking research of the highest standard that will be read, cited and applied by colleagues internationally.

Research areas of the Division of Molecular & Cell Biology include endocrinology, cancer and cell biology, plant biotechnology and microbiology. By applying advanced genetics and bioinformatics on transcriptomes and epigenomes, we identify target genes focusing on bioactive peptides and their receptors that regulate key biological processes. Through structural biology coupled to 3-D modelling, we aim to develop novel therapeutic drugs for diseases related to metabolism, blood pressure and cancer. Our members are also interested in investigating the fundamental molecular mechanisms of DNA replication and repair; construction of artificial chromosomes; genetically modified crops to improve biomass and biofuel production, and probiotics for food quality and health.

Members of the Division of Ecology & Biodiversity place a strong emphasis on studying the effects of environmental change, including:

- Impacts of climate change driven by global warming on terrestrial plants and animals;
- Consequences of global warming and ocean acidification on marine ecosystems;

- Paleoecology of biodiversity associated with historical climate change;
- Pollution impacts and the restoration of ecosystems;
- The international wildlife trade; and
- The global homogenisation of biota through human facilitation of invasive species.

Through a range of approaches from molecular, chemical and microbiological techniques to ecotoxicology, food-web analyses and fieldbased manipulative experiments, we undertake research of regional and global importance, and contribute to conservation and sustainable use of the rich biodiversity of tropical East Asia.

A number of staff in the Division of Ecology & Biodiversity are members of the Swire Institute of Marine Science (SWIMS), which is the Faculty's interdisciplinary institute for marine sciences. SWIMS has a marine station at Cape d'Aguilar in the southeast of Hong Kong Island.

SBS runs undergraduate majors in Ecology & Biodiversity, Molecular Biology & Biotechnology (both accredited by the Royal Society of Biology, UK), Biological Sciences and Food & Nutritional Science, and makes significant contributions to those in Biochemistry and Environmental Science. We also have Master's programmes in Environmental Management, Food Safety and Toxicology and Food Industry: Management and Marketing.

Department of Chemistry



The Department of Chemistry is among the world's elite, with excellence in undergraduate and postgraduate education, as well as in innovative, creative research in both fundamental and interdisciplinary chemistry research. At present, the Department has 26 professoriate staff and 2 lecturers.

The Department is also one of the best academic centres in the world, leading in research in Inorganic and Metal Chemistry, Photophysics and Photochemistry of Electronic Excited States, Synthetic Chemistry and Chemical Biology, and Computational Methodology. It is renowned for developing frontier interdisciplinary research programmes that bridge Chemistry, Materials Science, and Biomedical Science in order to tackle major scientific challenges related to energy, environment, healthcare, and medicine.

Members of the Department have been recognised by prestigious regional, national, and international honours and prizes, including 4 Endowed Professorships, 9 Croucher Senior Research Fellowships, 2 Members (Academicians) of the Chinese Academy of Sciences, 2 Foreign Associates of the US

National Academy of Sciences, 1 Fellow of the European Academy of Sciences, 2 TWAS Prizes in Chemistry, 2 Royal Society of Chemistry Centenary Medals, 2 State Natural Science Awards (1 First-Class and 1 Second-Class) and 1 L'Oreal-UNESCO For Women in Science Award. The Department has a State Key Laboratory of Synthetic Chemistry, a HKU-CAS Joint Laboratory on New Materials, 4 Areas of Excellence Programmes (3 completed and 1 on-going) and a Theme-based Research Scheme Programme (completed). Members of the Department have delivered prestigious, named lectureships, including Seaborg Lectureships at the University of California at Berkeley, Edward Clark Lee Lectureships at the University of Chicago, a Davison Lectureship at the Massachusetts Institute of Technology, a Novartis Chemistry Lectureship, a Lavoisier Lectureship at University of Paris 7, and an Earl L Muetterties Lectureship at the University of California at Berkeley.

Since 1995 the Department of Earth Sciences has focused primarily on the geology of Asia and the Asia Pacific Regions, and applied geosciences. Home to 23 professoriate staff (one of which is academician of the Chinese Academy of Science), the Department focuses on 3 main research themes: (1) Solid Earth and Planetary Sciences, (2) Applied Geosciences in Urban Areas, and (3) Earth History and Global Change. These are closely aligned with our 2 principal goals of carrying out cutting-edge frontier research, and dealing with fundamental scientific challenges of societal relevance.

Our strength has always been in Solid Earth and Planetary Sciences, where we combine the results from field studies with analytical and experimental work to unravel the processes that have shaped the Earth throughout its history, including the timing of important tectonic events, the assembly and breakup of supercontinents, the origin of the oceans, and the formation of related mineral deposits. Drawing on a multitude of talents within the Department, we also recently initiated new programmes to understand the formation and evolution of other terrestrial planets.

Our focus on applied geosciences is of vital importance, considering the highly

urbanised setting of Hong Kong and the associated geological problems. We have made significant strides in hydrogeology, rock mechanics, engineering geology, geophysics, and applied geochemistry. A major emphasis is on the understanding of groundwater supply, groundwater engineering, and related environmental problems. Our work is important to both Hong Kong and neighbouring mainland China, Taiwan, Korea, Singapore, and Malaysia. We have made important contributions, not only through publication in top journals, but also through practical mitigation of local environmental problems.

earth history and global change have become

more broadly relevant. We have contributed to the understanding of major events in the surface evolution of the Earth and with the timing and effects of the glacial-interglacial periods within its climate cycles. We have made advances in paleo-oceanography, atmospheric oxygenation, early life, vertebrate palaeontology, and mass extinction.

The key element of our research strategy is to combine classical geological (field) methods with cutting-edge laboratory work. At the same time, we are uniquely positioned in Eurasia

to explore many aspects of geosciences in relatively unknown areas. Looking ahead, our challenge remains to develop innovative solutions to global and local geological problems; maintain our established leadership position in Solid Earth Sciences; and to further develop in key areas, such as urban geology, planetary science, and global change. Realising that we have an ageing staff profile in certain areas, we will focus on our staffing strategy, improve our technical infrastructure, increase our knowledge exchange, and grow our revenue streams.

Department of

Over the past 10 years, earth history and global Earth Sciences



Department of Mathematics

The establishment of the Department of Mathematics (MATH) began with the founding of the Faculty of Science in 1939. Since then MATH has grown into a centre of mathematical research, education, and applications with regional and international visibility and impact. It is internationally excellent, even world-leading, in certain strategically planned research areas. Indeed, HKU Mathematics is ranked 1st in Hong Kong, 4th in Asia, and 36th worldwide according to the 2019 Times Higher Education World University Rankings by Subject.

The Department has 18 professoriate staff and has strengths in (1) Geometry, (2) Number Theory, and (3) Optimisation. We also have a base in several interdisciplinary areas such as Computational Mathematics, Information Theory, Operational Research, Financial Mathematics, as well as Applied and Stochastic PDEs.

International recognition of our teachers includes the following honours, awards, and prizes: 1 Academician of the Chinese Academy of Sciences (CAS); 1 member of the Fields Medal Committee of the International Congress of Mathematicians 2010; 1 Natural Science Award (Second-class) from the Ministry of Education of China; 1 Stefan Bergman Prize of the American Mathematical Society (AMS); 1 Feng Kang Prize of Scientific Computing; 2 Higher Education Outstanding Scientific Research Output (Team Member) Award (Second-class Prize) from the Ministry of Education of China; 1 Outstanding Research Achievement Award, Academy of Mathematics and Systems Science, CAS; 1 Fellow of AMS; 1 SIAM Fellows; and 2 "Top 1%" Highly Cited Researchers.

Since its inauguration in 1999, the Institute of Mathematical Research (IMR) at HKU has played a vital role in stimulating the research and learning environment of the Department and in elevating its international visibility. Collaborating with distinguished mathematicians, MATH and IMR have jointly organised many research programmes in pure and applied mathematics. We have also established strong partnerships with top centres of mathematical research, such as the Institut des Hautes Études Scientifiques, France, the Mathematical Science Research Centre, USA, and the Chinese Academy of Sciences, China.



Department of **Physics**

The Department of Physics conducts research at the cutting edge of fundamental and applied physics. The overarching research vision of the Department is to become locally pre-eminent, leading in Asia, and globally competitive in selected sub-fields of research. The Department currently has 24 academic staff at the rank of assistant/ associate/ full professor and 44 research staff, including research assistant professors, postdoctoral fellows, and research assistants, who are organised into 5 research groups: (1) Astronomy and Astrophysics; (2) Experimental Condensed Matter and Material Science; (3) Theoretical and Computational Condensed Matter; (4) Atomic and Quantum Physics; and (5) Experimental Nuclear and Particle Physics.

Its staff members have been highly active in producing high impact research outputs, as reflected by the number of citations (more than 11,000 in 2017) and highly cited papers (48 as of September 2018) on Web of Science. Honours received by the staff members include 2 Achievement in Asia Awards by the International Organisation of Chinese Physicists and Astronomers, 5 Croucher Senior Research Fellowships, 2 Croucher Innovation Awards, 6 Outstanding Researcher Awards, and 5 Outstanding Young Researcher Awards from HKU.

In the past decade, the Department has played a leading role in a number of large-scale, multi-disciplinary and multi-institutional RGC/ UGC research projects, including the Collaborative Research Fund (projects in spintronics, two-dimensional materials, and quantum physics) and the Areas of Excellence (theory, modelling, and simulation of emerging electronics). In 2017, the Department's research strength in two-dimensional materials was listed among the HKU's 14 Strategically-Oriented Research Themes.
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Department of Statistics and Actuarial Science

Established in 1967, the Department of Statistics and Actuarial Science (SAAS) now has 18 professoriate staff members. Strongly tied with international professional bodies in statistics and actuarial science, SAAS enjoys a very high profile in both teaching and research. SAAS research areas span the classical areas of statistics (time series analysis, resampling, survival analysis, and random matrices), a range of applied areas (biostatistics, clinical trials, and statistical forensics), and the rapidly developing areas of big data and artificial intelligence (machine learning and deep learning). SAAS is also distinctive in its specialisation in actuarial science, for being one of the 33 Centres of Actuarial Excellence (CAE) in the world and the only one in Asia, to date, to have received the Society of Actuaries CAE Research Grant.

According to 2019 QS World University Rankings by Subject, HKU ranked 34th in the world in Statistics and Operational Research. Three SAAS members have been elected as Fellows of the Institute of Mathematical Statistics, 3 as Fellows of the American Statistical Association. 1 as a Fellow of the American Association for the Advancement of Science, and 10 as Elected Members of International Statistical Institute. Three members have been ranked among the world's "Top 1%" of scientists by Clarivate Analytics' Essential Indicators. One member serves as the Editor of *Insurance*: Mathematics and Economics. 1 serves as the Executive Editor of the Journal of Statistical Planning and Inference, and many others serve as Associate Editors for top statistical journals. SAAS members also contribute to the statistical community by serving on various committees

and organising international conferences and workshops. For instance, 1 member is the President of the International Association for Statistical Computing.

Perfectly in line with HKU's vision, our strategy is to strengthen our impacts by encouraging interdisciplinary research. Through the concerted effort of the Faculty and SAAS, the Big Data Research Cluster serves as just such an interdisciplinary platform. In addition to maintaining our strengths in Stochastic Analysis and Statistical Methodologies — including time series, resampling, ruin probability, insurance risk — we are expanding research into Biomedical Statistics, Bioinformatics, and AI (computer vision and Natural Language Processing (NLP)), in order to fully embrace the new opportunities arising in this era of big data.

HIGHLIGHTED RESEARCH PROJECTS



Looking for Biodiversity? Follow the Ants. Dr Benoit GUÉNARD

Loss of biodiversity is a major concern for scientists. To understand the composition, evolution and geographic distribution of global

biodiversity, Dr Benoit GUÉNARD and his collaborators have built one of the first global distribution database for a group of insects. They are focusing on ants, one of the most abundant and ecologically important groups of terrestrial organisms, making them a perfect system to address the knowledge



gap. Dr GUÉNARD and his team have also expanded the knowledge on Hong Kong ants in the past years, describing 5 new species, including the rare "Golden Tree Ant" *Paratopula bauhinia*.

http://antmaps.org/

"Golden Tree Ant" Paratopula bauhinia 🤞





Overall spieces richness by region 1478 > 0

River Threats Professor David DUDGEON

Fresh waters occupy less than 1% of the Earth's surface yet host almost 10% of all species, including 1/3 of vertebrates. As such, they are hotspots of biodiversity. Because humans consume and contaminate fresh water, these habitats are extremely endangered. Professor David DUDGEON studies Asian streams and rivers, as well as the animals that live in and around them. His work ranges from field experiments on predation and competition to food-web dynamics and global-scale analyses of biodiversity. Wherever people are numerous, freshwater biodiversity is threatened (see map below). In densely populated regions such as East Asia, widespread challenges to human water security are accompanied by faunal impoverishment.





Evolutionary Biology Professor Richard SAUNDERS

Evolutionary biology focuses on the processes that drive evolution and the resultant patterns reflected in the tree of life. Professor Richard SAUNDERS and his postgraduates in the Plant Systematics & Phylogenetics Laboratory integrate both approaches, studying rainforest tree diversity using DNA sequence variation between species as a foundation for reconstructing the sequence of past evolutionary events. The resultant evolutionary trees form a conceptual framework for integrating studies of the genetic control and ecological function of traits, the pattern and tempo of speciation, and changes in geographical distribution. This innovative interdisciplinary research is of considerable conservation importance, enabling predictions of plant responses to global climate change.

A reconstruction of changes over the past 60 million years in the geographical distribution of selected genera belonging to the early-divergent flowering plant family Annonaceae

Conservation Forensics

Dr Caroline DINGLE and multiple researchers

The wildlife trade threatens many animal and plant species with extinction globally. Recognising Hong Kong's role as a major hub for both the legal and illegal wildlife trade, several Principal Investigators within the Division of Ecology & Biodiversity at HKU formed the Conservation Forensics Lab, a cross-faculty effort designed to help Hong Kong put an end to wildlife crime. Our team applies its expertise in genetic, isotopic, and network analyses to understand trade in a variety of endangered species, from shark fins and glass eels to pangolins and helmeted hornbills. We work closely with both local and international governments, as well as NGOs to ensure that our science is accessible and applied to enforcement actions throughout the region.



Molecular 🥬

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Plant Biotechnold

Professor Mee Len CHYE and multiple researchers

Professor Mee Len CHYE works in the area of plant biotechnology, particularly with stress-induced plant proteins and the plant acyl-CoA-binding proteins (ACBPs) from Arabidopsis (a model plant) and rice (a staple crop). Her research team intends to use ACBPs to generate transformed plants that can better tolerate the adverse effects of phytopathogens and the environment. Her collaborators at SBS include Professor Richard SAUNDERS. Dr Mingfu WANG, and Dr Clive Sze Chung LO. Professor CHYE's laboratory also conducts research on the manipulation of isoprenoid biosynthesis to accumulate health components in food crops.

Metastasis Treatment by siRN/

Professor Alice Sze Tsai WONG

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Metastasis is the cause of most (>90%) cancer-related deaths, and lacks effective treatment. Our recent work reports that a small interfering siRNA targeting the p70 S6 kinase — a key intracellular signalling mediator for the effects of multiple cytokines, growth factors, and hormones that characterise tumour progression, and which is delivered by a dendrimer nanovector — effectively inhibits the growth and metastasis of cancer stem cells. This approach constitutes a promising means of treating metastasis.





Autonomously Segregating Artificial Chromosomes

Dr Karen Wing Yee YUEN

Chromosome segregation errors lead to gains or losses of DNA, which result in chromosomal abnormality disorders and cancers. The centromere is a specialised chromosomal region that holds sister chromatids together before they separate, and attaches to microtubules to direct chromosome separation. Our laboratory investigates how centromere identity is passed on through cell cycles and generations, and how de novo centromere is established after chromosomal rearrangements, speciation, and on exogenous DNA. Using different model organisms, including budding yeast and the nematode, we study how DNA sequence and non-DNA (epigenetic) factors affect these processes. Our research will facilitate development of autonomously segregating artificial chromosomes.

DEPARTMENT OF CHEMISTRY

Chemical Biology

Professor Hongzhe SUN, Professor Dan YANG and Dr David Xiang LI

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Medicinal chemistry works at the interface of chemistry and biology to study the structure and activity of drugs. Research in this field involves the discovery, design, and development of substances with therapeutic effects. It also requires determining the mechanisms of action, as well as the metabolic processes of bioactive compounds at the molecular level. Our medicinal chemistry programme aims to identify novel therapeutic targets, and develop molecules with anti-cancer, anti-bacterial, and anti-aging activities. This is strongly supported by our tradition of excellence in synthetic chemistry and rapidly growing expertise in chemical biology and biomedicine.

Oral Feeding of Novel Probiotic Mixture, Prohep Dr Hani EL-NEZAMI

A team from the School of Biological Sciences led by Dr Hani EL-NEZAMI demonstrates that oral feeding of novel probiotic mixture, Prohep—comprising several probiotic strains—is effective in reducing subcutaneous HCC growth in C57BL6/N mice, especially when given tumour injections one week in advance over the treatment model (probiotics administered at the same day of injection). This project is the first to provide evidence demonstrating that the oral feeding of a probiotic mixture may have a beneficial effect against liver cancer development. Based on the research findings, we have been granted a US patent, and further applications are under consideration in both the EU and China.



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Bupramolecular Chemistry Professor Vivian Wing Wah YAM

Supramolecular chemistry is chemistry beyond the molecule. An understanding of the weak non-covalent intermolecular forces that hold the molecules together allows one to control and manipulate how molecules align, assemble,



Metallosupramolecular core-shell co-assembly

and pack with respect to each other. These are important parameters that can govern the shape, morphology, and function, as well as the mechanical strength, electronic, optical, and charge transport properties of molecular materials and biomolecules. All of these fundamental studies will contribute towards the rational design of innovative classes of supramolecular polymers, functional materials, biomimetics, luminescent chemosensors, and diagnostics.

Metal Chemistry Professor Chi Ming CHE

20.00

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Metal ions play indispensable roles in medicines, catalysis, and molecular materials. The diverse, unique coordination geometries, redox properties, and large spin-orbit coupling efficiency of metal ions allows metal compounds to be engineered to display unique structural scaffolds for specific binding interactions with bio-molecules and long-lived emissive electronic excited states for the next generation



of lighting technology, sensing applications, and solar light to chemical conversion reactions. Metal ions are capable of activating unreactive chemical bonds in the inner coordination sphere, thereby reducing the activation barrier for chemical reactions to proceed in a controlled manner under mild conditions. While precious noble metals are commonly used in industry and academia for these endeavours, the low abundance on Earth and the toxicity of noble metals calls for fundamental research into the metal chemistry of biocompatible Earth abundant metals presently the direction of research in Metal Chemistry in the Department of Chemistry. The Department is an elite academic centre in the world for the Chemical Biology of Metal Compounds, Basic Research and Interdisciplinary Applications of Luminescent Metal Compounds of Gold and Platinum, Functionalisation of Unreactive Chemical Bonds with Reactive Metal-Ligand Multiple Bonded Species, and Iron Catalysed Oxidative Functionalisation of Organics. HKU Metal Chemistry has been internationally recognised with two staff elected to the Foreign Associate of National Academy of Sciences, USA.



Nanomaterials

Dr Jinyao TANG

Traditionally, while material properties are determined by the composition and chemical structures of molecules, the nanostructures of materials can dramatically enhance the properties and/ or exciting new functions of materials. The applications of nanomaterials can be expanded into the fields of energy, medicine, electronics, and beyond. The Department is developing programmes for synthesising, designing, and characterising functional nanomaterials and

nanodevices. Specifically, nanomaterial-based smart colloidal particles are being developed in regards to human healthcare. By carefully designing the chemical reaction and electrokinetic mechanism of functional nanocolloids, smart drug delivery and noninvasive nanosurgery systems can be developed.

Synthetic Chemistry Professor Pauline CHIU

Synthetic chemistry is the heart of what makes chemistry unique — the ability to make substances by synthesising and changing their structures at the molecular level in the laboratory. The substances that are synthesised can be fuels, new materials, probes

Nanomaterial for Lealthcare • Smart Drug Delivery • Non-Invasive Surgery • In-situ Treatment

Physical Chemistry and Computational Chemistry Professor David Lee PHILLIPS

Physical chemistry uses a wide range of experimental and computational methods to better understand how physical and chemical processes take place. Timeresolved spectroscopy experiments can be



utilised to directly observe and characterise electronic excited states and very short-lived intermediates in chemical reactions and physical processes that are involved in new materials being developed for applications in solar energy, photocatalysis, drug release, release of biological effectors for the study of physiology and chemical biology processes and many other areas. Similarly, a variety of computational methods and models can be employed to predict and compare to available experimental results to gain deeper understanding and insights into how the chemical and physical processes occur for selected new materials that have desirable properties and behaviour. This new experimental and computational information can thus help aid the design and development of new materials being developed by other research groups in the Department of Chemistry and the Faculty of Science for applications in the areas of Metal Chemistry, Nanomaterials, Supramolecular Chemistry, Chemical Biology and Medicinal Chemistry.

for biological studies, or new drugs. Being able to change substances at the molecular level allows us to fundamentally modify their properties and improve their performance. In fact, it is hard to imagine any new scientific advances without synthetic chemistry at some stage.

All of these applications rely on the research and development of chemical reactions that are the laboratory tools which make these molecular transformations possible. Synthetic chemistry is therefore also fundamental research on chemical reagents and reactions that empower chemists to make molecules selectively, using environmentally benign technologies. Synthetic chemistry efforts in the Department of Chemistry have achieved success in the development of novel metal-catalysed reactions, cycloadditions, oxidations, reductions, and peptide couplings. The application of these chemical reactions have resulted in the synthesis of anti-cancer compounds, antibiotics, drug libraries, new materials and natural products.





DEPARTMENT OF EARTH SCIENCES

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Paleoproterozoic Tectono-thermal Evolution

Professors Guochun ZHAO and Min SUN

Focusing on Paleoproterozoic Tectono-thermal Evolution of the Jiao-Liao-Ji Belt, the research has led to the reinterpretation of the formation and evolution of the Paleoproterozoic Jiao-Liao-Ji Belt developing from an early stage continental rifting basin, through an ocean in the intermediate stage, to a later stage closure of the ocean, leading to continent-continent collision. It also reveals the transition of tectonic regimes for early Precambrian.

Q

Engineering Geology

Dr Louis Ngai Yuen WONG

The structural stability of rock masses is dictated by the geological structures present — most notably joints. A rock joint survey of various granites was carried out at 9 different locations in Hong Kong. The 1,327 joint spacing measurements, spanning from 0.005m

to 4.5m, reveal that the log-normal distribution appears to be the best fit model. The project was the first step in generating big data for joint spacings in order to foster the development of the numerical modelling of inherent discontinuities in rock masses. The research outcome will hopefully lead to the better engineering design of future caverns and tunnels.



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Characterisation of Hydrothermal Systems on Mars Dr Joseph MICHALSKI

Life likely originated in hydrothermal systems on the ancient Earth. It makes sense that the search for life on other planets, such as Mars, should target ancient hydrothermal environments. Our work focuses on analysing the mineralogy and geochemistry of the Martian crust, using infrared measurements from orbiting spacecraft and rovers, in order to search for and characterise hydrothermally altered rocks on the red planet.

We have developed a Planetary Spectroscopy and Mineralogy Laboratory in the Department of Earth Sciences, where we use similar techniques and technologies to characterise hydrothermal minerals and altered rocks for comparison to those on other planets. Our work helps inform the site selection of landed spacecraft in the search for signs of life on Mars.

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Earth's Surface System Dynamics throughout Its History

Dr Ryan MCKENZIE

Research focuses on investigating how plate tectonic processes influence long-term changes in Earth's surface environment. Of critical importance is understanding how global-scale variations in the processes that shuttle carbon between Earth's deep interior and the atmosphere drove major changes in the ancient climate. How these climatic transitions influenced long-term trends in ecosystem structure and biodiversity are being further investigated. Most notably, to understand how variation in the magnitude of carbon fluxed into the surface system can be linked to mass extinction events.



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Geochronology in Evolution Dr Suchin CHANG

Research has focused on absolute ages for key evolutionary events. For example, an accurate age for the first flowering plants has been determined. Research has also shown that the oldest flowers bloomed 166 million years ago, allowing us to better understand the Jurassic environment. Furthermore, the research group has successfully established a robust age for a unique amber biota from Myanmar. The study provides new insights into the vanished tropical forests of the Late Cretaceous Period.



Research group from the Department of Earth Sciences established a reliable age for amber inclusions

Palaeontology Dr Michael PITTMAN

Dr Michael PITTMAN's laboratory focuses on a key question in modern palaeontology: "How did birds transition to flight?" While the field has focused on fossil bones and feathers, the team has pioneered multidisciplinary research that has made its largest impact with the neverbefore-seen reconstruction of dinosaur soft tissues. The unique use of lasers to visualise parts per million differences in a fossil's soft tissue geochemistry has led to significant advances in understanding flight origins, as well as multiple high-impact papers. Spin-offs of the laboratory's technology have resulted in many discoveries and advances outside of birds, including pterosaurs, fish and mammals.

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Paleoclimatology

Dr Zhonghui LIU

In a geological context, humans live in a relatively cool period of Earth's climate history. Unfortunately, instrumental climatic records are too short, roughly spanning only 150 years. With the anthropogenic future climate changes expected, it is important to study past climatic changes beyond the instrumental period (paleoclimatology), which provides clues to maintaining warm climate forcing mechanisms. In particular, various aspects of the climate system, including atmospheric CO₂ levels, temperature, aridity/ rainfall, and ocean and atmospheric circulation, are all studied to infer the chain of climatic processes to better project future climate change.

Sediment/ rock sequence records past climatic changes

31.29





Operations Research Professor Wai Ki CHING

In today's world of rapid information technology and internet economy development, transparent logistics is increasingly important. In this research, our main objective is to develop effective segmentation methods for GPS trajectory data generated in logistics transportation. We study the movements and activities of vehicles and extract business affair information according to their behaviours. This is very challenging, due to the complex vehicle trajectories and massive transportation data generated daily. Currently, a probabilistic logic-based data segmentation method is proposed to find all business points and assist in classifying business affairs.





Automorphic Forms and Combinatorics Dr Benjamin KANE

We investigate number theoretic questions using techniques from automorphic forms, which are certain highly symmetric functions. Founded on the properties of basic arithmetic and prime numbers, number theory plays a central role in mathematics. The methods used are primarily analytic in nature. The first type of application is combinatorial in nature, revealing information about counting problems. Another central direction investigated are the properties of L-functions, which, roughly speaking, are generalisations of the Riemann zeta function.



Imaging Science

X+Y

Professor Michael Kwok Po NG

The interdisciplinary field of imaging science is experiencing tremendous growth. New hardware capable of imaging objects and structures from nanoscale to astronomical scale are continuously being developed and enhanced. As a result, the reach of science and medicine has been extended in unexpected and exciting directions and discovery. The impact of this imaging technology has generated computational, mathematical and statistical problems for the formation, acquisition, compression, transmission, and analysis of images.



Complex Differential Equations Professor Tuen Wai NG

Briot and Bouquet (in 1859 for n=1) and Picard (in 1880 for n=2) showed that any meromorphic function and its n-th order derivative are algebraically independent over the complex number field, unless the meromorphic function is elliptic, rational in exponential functions, or rational. Eventually in 2009, with Eremenko and Liao, we applied the Nevanlinna theory and Painlevé

analysis to show that this is actually true for all n. The method of proof was then further developed by the research team at HKU into a systematic procedure to construct explicitly, all meromorphic travelling wave solutions of some important partial differential equations, such as the real cubic Swift-Hohenberg equation for pattern formation and the complex cubic-quintic Ginzburg-Landau equation for optical pulse propagation.





Complex Geometry revolving around Symmetry and Geometric Structures

Complex Geometry Professor Ngai Ming MOK

"Complex Geometry Revolving Around Symmetry and Geometric Structures" provides a global perspective on contributions to Complex Geometry, as well as a projection for the on-going research. This includes work on VMRT theory — a major component of Professor MOK'S 2007 State Natural Science Award and his 2009 Bergman Prize from the AMS — together with his recent work on geometric substructures and contribution to Functional Transcendence Theory in Mok-Pila-Tsimerman, resolving the Hyperbolic Ax-Schanuel Conjecture on Shimura varieties. The chart represents an integrative approach to Complex Geometry spanning Differential Geometry, Kähler Geometry, Arithmetic Geometry, and Logic.



3		3	4	8	6	9	8	9	10
1	12	1	14	15	16	P	18	P	20
21	22	23	24	25	28	27	28	29	30
37	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	P	48	49	50
51	52	59	54	55	56	57	58	59	60
61	62	63	64	65	66	87	68	69	70
8	72	73	74	75	76	77	78	79	80
81	82	89	84	85	86	87	88		90
91	92	93	94	95	96	37	98	99	100

Prime numbers from 1 to 100 in Java

X+Y

Number Theory Professor Kai Man TSANG

As one of the oldest subjects in mathematics, number theory has found important applications in computer science and cryptography. The Lagrange problem, a companion to the well-known Goldbach conjecture, states that every large positive integer of the form 24k +4 can be represented as the sum of four squares of odd prime numbers. Our research in this direction is to obtain approximations to this difficult problem by using instead of the prime numbers — those integers with very few prime factors. Currently, we show that using integers with at most four prime factors is sufficient.



A cyber lock with public keys

Optimisation

Professor Xiaoming YUAN

Optimisation finds "best available" values of some objective function given a defined domain. The generalisation of optimisation theory and techniques to other formulations constitutes a large area of applied mathematics. It also plays a bridging role in connecting applied mathematics with various other disciplines such as computer science, data science, statistics, scientific computing, and engineering. In particular, optimisation is an essential mathematical tool for tackling challenges arising in artificial intelligence, deep learning, and many other big data areas.



X+Y

Scientific Computation and Uncertainty Quantification Dr Zhiwen ZHANG

Experiment

Uncertainty

quantification

Many problems in science and engineering involve uncertainties, such as pollutants being transported in groundwater and electrons propagating in impure conductors. Building mathematical models to describe the uncertainties in these problems and quantify their influences on the solutions is of great importance. Stochastic computation and uncertainty quantification is an emerging research area. Supported by funding from the Hong Kong RGC, Dr Zhiwen ZHANG's research group strives to address several challenging problems

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in this field, including numerical methods for multiscale random elliptic problems, Helmholtz equations in random media, Schrodinger equations with random potential, and computing effective diffusivity for stochastic flows.

Computation

X.

Combinatorics

Professor Wenan ZANG

Combinatorics is the branch of mathematics primarily concerned with problems of selection, arrangement, and operation within a finite or discrete system. It involves the enumeration (counting) of specified structures, the existence of such structures that satisfy certain given criteria, the construction of these structures, and optimisation (finding the "best" structure or solution among several possibilities).

Combinatorics is closely related to many other areas of mathematics and has a rich variety of applications, such as logic, statistical physics, evolutionary biology, and computer science.



Quantum Information and Computing

Professors Hoi Fung CHAU and Zidan WANG

Quantum information science is the art of using quantum mechanics information processing. It is at the cutting edge of the interdisciplinary field of quantum and information sciences, as well as quantum technology. Our professors have been working on theoretical studies of building quantum computers using topological and geometric methods, as well as quantum cryptography — construction of unhackable secret communication by means of photons. More recently, they have also been working on

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Renewable Energy

Professor Aleksandra DJURIŠIĆ

Due to environmental concerns over the use of fossil fuels, there is increasing interest in renewable energy. Solar energy is particularly promising due to its vast availability, which significantly exceeds human energy needs. Unfortunately, its widescale implementation is hampered by the high cost of conventional silicon photovoltaics. As such, there have been intensive research efforts

made in the development of efficient, low cost, solutionprocessable photovoltaics. While perovskite solar cells (PSCs) are efficient and solution-processable, they have poor stability. Our research has been devoted to the development of efficient PSCs with improved lifetime and stability by material development and device architecture, as well as encapsulation optimisation, which addresses a significant obstacle to their practical applications.



generalising artificial intelligence (AI) to the quantum world – quantum super-AI (QSAI). Our research should help to build a safer and more efficient cyber world, as well as fault-tolerant quantum computers. Importantly, a number of our quantum cryptography and geometric quantum computing proposals have recently been implemented by several experimental groups.



Best performing perovskite solar cell during outdoor stability testing, June–July 2017. Grey stripes denote typhoon signal No.8, yellow stripes denote amber rainstorm warnings, and red stripes denote red rainstorm warnings. The inset shows the outdoor stability testing mount.

> I-V curves of the best performing rigid and flexible perovskite solar cell devices with Cu:NiOx hole transport layers





Cold Atom Physics

Professor Zidan WANG and Dr Shizhong ZHANG

Cold atom physics is a new interdisciplinary field that has emerged over the past 20 years with the realisation of Bose-Einstein condensate in dilute atomic vapours. Now at the forefront of modern atomic physics, it has substantial overlap with condensed matter physics as well as quantum information. Recently, it has played an important role in the study of many-body dynamics and topological states. Over the years, studies into cold atoms have improved our understanding of the interaction effects and have led to, among other things, the greatly improved precision of atomic clocks. This has tremendous technological implications for the precision of global positioning systems (GPS). At HKU, research into cold atoms has focused on theoretical studies of interaction effects on transport and novel quantum states.



Topological Materials

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Dr Gang CHEN, Dr Zi Yang MENG, Professor Shunqing SHEN, Dr Chenjie WANG and Professor Zidan WANG

Topological materials are novel phases of matter with band structures that are protected by topology and symmetry. The key feature of a topological material is the emergence of the boundary states or particles of the relevant system. This includes insulators, superconductors, metals in condensed matter, photonic crystals, and metamaterials, as well as classic mechanical systems. The prediction and discovery of various topological materials has been one of the most important achievements in physics and material sciences in recent decades. It could even have potential applications for the next generation of electronic and optical devices, and in topological quantum computation.



2D Materials

Professor Xiaodong CUI, Dr Dong-Keun KI, Professor Mao Hai XIE and Professor Wang YAO

Two-dimensional materials are an exciting research frontier with great potential for future electronics and optoelectronics. The variety of 2-D materials features a wide range of material properties, including metals, semi-metals, semi-conductors, and insulators, as well as exotic physics associated with electrons' spin and valley degrees of freedom, which allow efficient information processing. Physicists at HKU are at the forefront of exploring the potential of 2-D materials. Among the findings, we have theoretically predicted the optoelectronic controllability of valley in 2-D semiconductors and produced the first experiment to demonstrate the light control of valley. The research has been very highly cited by other scientists around the world.





Astronomy

Professor Kwong Sang CHENG, Dr Jane Lixin DAI, Dr Jeremy Jin Leong LIM, Dr Stephen Chi Yung NG, Professor Quentin A PARKER and Dr Meng SU

Two particularly active areas of astrophysical research are high energy physics and late stage stellar evolution with particular foci on pulsars (ultradense remnants of high-mass stars and an excellent place to study extreme physics) and planetary nebulae (the glowing evolved ejecta of lower mass stars that offer key insights into stellar evolution). HKU astronomers have made significant progress in understanding both phenomena including the building of a self-consistent physical pulsar model to explain the high-energy gamma-ray emissions; the mapping their radio emissions and magnetic field structure of their surrounding nebulae and identification of new pulsar candidates using big data and machine learning algorithms.

Photo courtesy: Chandra X-ray Observatory, NASA





Word vector visualisation

Localising the hyperdense middle cerebral artery (MCA) dot sign (see arrow) from the original brain CT images



Big Data Dr Philip Leung Ho YU

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In recent years, with the rapid development of computing technology, big data has developed into an exciting area that is attracting extensive attention from academia, industry, and governments. The complexity of big data brings new opportunities and challenges to modern statistics. Recently, the Department has developed advanced deep learning models for phrasebased machine translation. For example, natural language processing and machine learning algorithms have been applied to classify comments on

> YouTube to determine whether they indicate the risk of suicide. By identifying specific comments as early as possible, it is hoped that lives can be saved. A recent collaborative project involves the development of an artificial intelligence system to provide rapid diagnosis of acute ischemic stroke, so as to potentially inform in the urgent triage and treatment of patients.

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Biostatistics

Drs Eddy Kwok Fai LAM and Zhonghua LIU

As one of the strategic research directions of the Department, Biostatistics plays an important role in biomedical research, with a focus on personalised medicine over the past decade, which will also be the lead focus for the decade ahead. It involves many important areas in statistics, including statistical genomics research, clinical trials, survival analysis, and medical imaging with modern machine learning techniques. The advancement of biostatistical research allows clinicians to provide early detection for high-risk subjects through their individual genomic profiles, implement effective personalised prevention protocols for those subjects, make an accurate diagnosis at an early stage, and design personalised interventions. Overall, population health will also be improved as a result of the wide-range of applications in public health, medicine, and insurance.

DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE

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interaction Econometrics modelling empirical statistics repression models risk time methods change theory dynamics change theory dynamics high-dimensional theory complexity



Econometrics Drs Guodong LI and Chen WANG

Econometrics focuses on the application of statistical methods to economic data to give empirical content to economic relationships. Econometric theory uses statistical approaches and mathematical statistics to evaluate and develop econometric methods. The Department has developed many new econometric methods which have been published in numerous top econometric journals, and has established a high reputation in the areas of high-dimensional dependent data, risk management, and quantile regression. Econometric theory can be applied to real-world data for assessing economic theories, developing econometric models, analysing economic history, and relevant forecasting.

Time Series Analysis Professor Wai Keung Ll

How the new model switches among regimes?

Time Series Analysis is one of the flagship areas of the Department. Since 1999, it has been recognised as an area of research excellence at HKU, and is world renowned for works including diagnostic checks for time series models under heterogeneous error variance structure and hyperbolic (long) memory; semiparametric models that resulted in a Royal Statistical Society discussion paper; the theory of unit root tests for linear models under heterogeneous error variance structure; new nonlinear time series models with a buffered zone that supersede the classical ones; and new models for realised volatility matrices, with applications in high frequency data and, more recently, tensor time series analysis.



The effect of using the buffered threshold process instead of the classical threshold process.

Remark: Higher (or lower) value for Rt refers to higher (lower) regime

Actuarial Study of Dependent Risks: Analysis and Applications Professor Kam Chuen YUEN

As the rapid growth of insurance and investment products introduces a great deal of complexity to the valuation of financial firms, careful and thorough assessment of dependent risks is crucial to the development of sophisticated tools for dynamic financial analysis. Actuarial research is both profound and challenging, and the research outcomes are expected to have a number of important applications, such as design of investment and reinsurance strategies, and the measurement and management of insurance and financial risks.





DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE

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Clinical Trials and Machine Learning

Professor Guosheng YIN

With the increasing trend of making machines (computers) to learn like human beings, the applications of machine learning (in particular, deep learning) in clinical trials and medicine are becoming ubiquitous. The most obvious one is image diagnostics in radiology, e.g., X-ray images, computed tomography (CT), magnetic resonance imaging (MRI). Accurate diagnostics of these images can help expedite the process of treatment and improve disease cure probabilities and life savings. Utilisation of the electronic health record data is another area that can boost health care for patients and reduce medical errors. With the availability of massive unstructured text data which have not been fully exploited in the past, natural language processing techniques nowadays can be used to extract useful clinical information from the data. Deep learning can also make more accurate prediction of patients' survival probabilities in comparison with traditional survival models. This is just the dawn of machine learning in medicine and many applications are promising yet needs further validation in randomised clinical trials.

Artificial Intelligence Professor Jeff Jianfeng YAO

Through its recent recruitment, the Department has formed a group of active researchers in the area of applied AI. Current research topics include deep learning, Bayesian learning, and image content analysis. Target application areas are medical data analysis and forecasting; prediction of clinical impacts and disease risks of human genetic mutation or variants; pattern recognition systems, such as face recognition, character recognition, and handwriting recognition; and video event detection and content analysis. The group also conducts more fundamental aspects of AI technology, such as the theory of deep learning, deep neural networks, and video image modelling.

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Statistical DNA Forensics Professor Tony Wing Kam FUNG

DNA profiling is one of the most powerful tools in forensic science, and it is widely used in the investigation of criminal offences. For a large variety of crimes, it is not unusual for the evidence samples to contain the DNA of more than one person. Statistical analysis of complex DNA mixtures is challenging, especially when the allele peak area, allelic dropout, and artefacts such as stutters, are taken into account. A recent development in DNA forensics is in the prediction of the age of the perpetrator, based on DNA methylation using statistical learning and artificial intelligence methods.



Figure courtesy of Xiaoming SHEN, School of Medicine, Shanghai Jiao Tong University



Figure courtesy of John M BUTLER, National Institute of Standards and Technology, Maryland, USA



THE SWIRE INSTITUTE OF MARINE SCIENCE



Adaptive Mechanisms of Oysters to Ocean Acidification Dr Thiyagarajan VENGATESEN

Ocean acidification (OA) is threatening global oyster aquaculture. This is a particularly serious issue for China, which produces more than 80% of the world's oysters. To provide an accurate picture of how this unprecedented threat may impact oysters, Dr Thiyagarajan VENGATESEN's group applies tools from environmental omics, mechanical engineering, molecular biology, and materials science to understand the adaptive mechanisms of oysters to OA. Through this interdisciplinary collaboration, Dr VENGATESEN has developed technologies for identification of biomineralisation and the metabolic pathways involved in oysters' adaptation to OA. Recently, he has been working with industries, growers, and governments to combat OA impacts on oyster aquaculture in China.

The Power of Proteomics Oyster Metabolic pathway response to OA and multiple climate change stressors



THE SWIRE INSTITUTE OF MARINE SCIENCE

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Mangrove Forests

Dr Stefano CANNICCI

Mangrove forests are unique intertidal habitats with a key role in the nutrient cycling of tropical coastal ecosystems and global carbon cycling. However, they are under siege from a number of direct and indirect anthropogenic stressors, especially in South East Asia and Southern China. Dr Stefano CANNICCI and his students study the distinctive evolutionary adaptations shown by mangrove flora and fauna, and assess the contribution of each population to mangrove ecosystem functions and services. The results show that biodiversity and functional redundancy of mangrove fauna peaks in South East Asia, where the destruction of mangroves is at its worst.



Margenet true richnes 11-2 Species 41-5 Species 41-6 Species 471 Species 471 Species

Species' Behaviour along the Shore

Professor Gray A WILLIAMS

In summer, Hong Kong's shores are extremely hot, with temperatures reaching over 55°C during low-tide as the sun heats the rock. Consequently, many species suffer high mortality; some, however, do not. Professor Gray A WILLIAMS's research tries to understand what differentiates these species. To do this, his group uses a multidisciplinary approach, coupling field investigations of species' behaviour on the shore, manipulative experiments, and laboratory measurements of their physiological responses. Results show that species adopt a variety of strategies to tolerate these extremes; and this information can be used to predict which species will be the "winners" or "losers" under future climate warming scenarios.

Measuring in-situ thermal images of intertidal species



HE SWIRE INSTITUTE OF MARINE SCIENCE

Biodiversity

Dr Moriaki YASUHARA



Biodiversity has been changing both in space and time. While we know a great deal about spatial diversity patterns, we know much less about those related to time. Fortunately, we have the remains of, often small, ancient organisms — fossils. Paleoecology, ecology using fossils, is essentially the only tool we have to reconstruct past ecosystems and biodiversity dynamics beyond a biologically observed time series. Dr Moriaki YASUHARA uses these microfossils to measure the spatiotemporal dynamics of large-scale biodiversity patterns, the impact of climate on species diversity, and the controlling factors of biodiversity patterns and changes. His research interests also cover Anthropocene marine ecosystem degradation.



Eco-shoreline Designs for Sustainable Coastal Development

Professor Kenneth Mei Yee LEUNG

Conventionally, reclamation and marine infrastructure projects often adopted simple, artificial, and vertical or sloping seawalls as coastal defences against wave action, flooding, and land erosion. Nevertheless, these structures do not possess the microhabitats that marine organisms use as refuges and feeding grounds. By incorporating ecological concepts, Professor Kenneth LEUNG is helping design and build "eco-shorelines" that not only enhance marine biodiversity and ecosystem services, but also protect the shoreline. With landscape architecture designs, these eco-shorelines can be constructed using natural materials, such as mangroves, to offer a user-friendly waterfront for people to enjoy, thereby promoting a "water-friendly" culture.



Image courtesy: Civil Engineering and Development Department, HKSAR Government

In a forest of hundred thousand trees, no two leaves are alike. And no two journeys along the same path are alike.

Paulo Coelho

FROM CAMPUS TO SOCIETY

Fond Memories of Generations of Alumni

BRANCH Alumni reaching out far to contribute to society Whispers encircle, wishes resonate, branches and leaves enlace. An oak tree stands across time and space, dream chasers to come, await to embrace. Through past to present, arrive and apart, lush oak branches, connect with heart.

ALUMNI ARE THE BRANCHES

It all begins with a little green stem rising above the soil, straight and firmly. Years fly by as if time has gone into fast-forward. One stem becomes two branches, and two become three. Eventually, countless branches extend out from a sturdy tree. If the tree represents the Faculty, then our alumni shall be its branches.

Every year, a group of vibrant and talented final-year students graduate from the Faculty. **"It takes ten years to grow trees, but** a hundred years to rear generations of people," said Professor Billy CHOW, Associate Dean for Development and External Relations, also the Chairperson of the HKU Science Oak Anniversary Organising Committee. **"The Faculty of Science is devoted** to educating and nurturing its students. Many key leaders from a wide range of industries in Hong Kong and around the world are actually alumni of our Faculty," emphasised Professor CHOW.

The roughly 4 years of study at university is both unique and valuable to each undergraduate. **"The university you come from is** something that stays with you for the rest of your life," explained Professor Quentin A PARKER, Associate Dean for Global. **"The** University of Hong Kong is an elite global university, offering superb education that equals to some of the best in the world. Our alumni should be very proud of themselves and of our Faculty," he added.

DIVERSE BRANCHING: THE STRENGTH OF THE FACULTY

eing a part of the Hong Kong community, be it industry or government, many of our alumni have become key figures in society. "It may be challenging to connect with our alumni, since they are a part of nearly every sector in Hong Kong and around the world, instead of a single profession or industry," said Professor CHOW. "Yet, thinking of it in another way, we can view it as them being very good at what they do."

As both big and small cogs in global and regional development, our alumni are involved in laboratories, finance and accounting, environmental protection, medicine, and academia to name a few. Although scattered across many countries, our alumni are dedicated to using their knowledge and talents at all levels, and will continue to have a huge impact on the world. Oak tree endows meaningful symbolisation of the interconnectedness of the Faculty and alumni, also the indivisibility between both.

Professor Billy Kwok Chong CHOW

Associate Dean for Development and External Relations

"Science is the key faculty in any university, since scientific process is what drives nearly everything on the planet, in one way or another. By being scientifically literate global citizens, decisions made by our alumni throughout their lives will be based on critical thinking, analytical skills, and application of the scientific method. They are able to separate the wheat from chaff regarding the bewildering variety

of information we are all now confronted with," said Professor PARKER. "Students are being inundated with a vast amount of information in this age. The Faculty of Science teaches our students to be critical thinkers, so that when they graduate they can apply these skills in their lives and make more informed decisions. When they reach senior positions of power later in life, their decisions could affect a great many people," he explained.

WE CONNECT

ike the branches of an oak, there is a solid network at HKU, connecting everyone, everywhere. We are more than just a Faculty here, we are a scientific community and a family. **"It is a two-way relationship,"** said Professor PARKER. **"We are a network that keeps alumni updated about our visions and plans; and they can even be part of it and work together with us. It is important to make them feel connected in the future."**

To that end, a database is being built within the Faculty and Departments through the collective efforts of class representatives and the HKU Science Alumni Association. **"Since 2017, class representatives have been helping us to establish a database and build groups among** their classes," Professor CHOW added. "I hope that our alumni can have a sense of belonging and be part of the HKU Science community. This is what I want to achieve during my term of office."

Having a strong connection between the Faculty and its alumni is crucial. "Keeping up a good network, our alumni will be aware of our success and see themselves as part of an ongoing positive enterprise. We can also make sure we recognise their success, and that the Faculty is clearly seen to be delivering excellent graduates who contribute valuably to society," said Professor PARKER.

Science is a key driving force of the world's advancement and our alumni are playing important roles in this process.

> **Professor Quentin A PARKER** Associate Dean for Global

MORE THAN BRANCHES

n oak tree is a growing organic body," explained Professor CHOW. The alumni branches reach out from the Faculty tree, but are always connected back to their alma mater. Nevertheless, they are also much more than this. "Because they are such an important part of our Faculty, alumni can be any part of the tree," Professor CHOW elaborated. The alumni can be the roots, acting as a solid foundation, or the robust trunk, providing strength. In the end, what matters is that our alumni are the most valuable asset to the Faculty.

Professor PARKER, however, sees the relationship from a different perspective. **"Looking** at the alumni as acorns, in turn they will grow to become saplings, then into mighty oak trees of their own. When they do, hopefully, they will remember the family from which they came." We do not merely visualise a single oak tree either. We see our alumni as a great forest, with each one making their own connections and achievements, providing shelter and wealth, and supporting Hong Kong, as well as the global science community.

Distinguished Alumni Award 2019

HKU SCIENCE OAK ANNIVERSARY

HKU SCIENCE DISTINGUISHED ALUMNI AWARD 2019

Distinguished Alumni with Notable Achievements in Science Education or Scientific Research

alking through 80 years, HKU Science nurtures generations of alumni, who devote their time and effort for the betterment of society. We believe the Oak Anniversary is an opportune time for us to reconnect with our alumni and feature their achievements. On this auspicious occasion, we have launched the Distinguished Alumni Award 2019 to honour their commitment in striving for excellence and creating impact by science knowledge and skills.

In this exercise, 18 Distinguished Alumni were selected in celebration of our oak anniversary. Together with the 43 Distinguished Alumni¹ selected on the occasion of Faculty's Platinum Jubilee in 2009, we have 61 Distinguished Alumni who excel in their walks of life, inspiring the future generations.

Distinguished Alumni 2019 were selected based on one or more of the following criteria:

- Role in science education and/ or scientific research
- Business/ professional achievements in a field of interest or scholastic achievements, with outstanding personal attributes
- Services and contributions to HKU Science and the University
- Community services and contributions to society and the world

"Pursue the higher purpose on hands and knees; unlock the impossible with your mind."

Professor Shuk Mei HO 1974 BSc graduate 1977 PhD graduate

- Vice Chancellor for Research of University of Arkansas for Medical Sciences, Arkansas, USA (2019 – present)
- Professor of Pharmacology & Toxicology of University of Arkansas for Medical Sciences (2019 – present)
- Director of Cincinnati Cancer Centre and Hayden Family Endowed Chair for Cancer Research University of Cincinnati Medical Centre, Cincinnati, USA (2013 – 2019)
- Associate Dean for Basic Research of University of Cincinnati Medical Centre (2011 – 2019)
- Jacob G Schmidlapp Professor and Chairperson of the Department of Environmental Health, University of Cincinnati Medical Centre (2005 – 2019)

Professor Tze Leung LAI

1967 BA graduate in Mathematics

- Ray Lyman Wilbur Professor of Statistics of Stanford University, USA
- Professor, by courtesy, of Biomedical Data Science in the School of Medicine and of the Institute for Computational and Mathematical Engineering in the School of Engineering, Stanford University
- Director of Financial and Risk Modelling Institute, Stanford University
- Co-Director of Centre for Innovative Study Design, Stanford University
- Advisory Committee member of Stanford in Hong Kong



"Acquisition of knowledge serves as a higher guiding light, and with an intelligent and inquiring mind, one can be a person of wisdom and virtue."

Professor Frederick Koon Shing LEUNG

1977 BSc graduate

- Chair Professor and Kintoy Professor in Mathematics Education of HKU
- Distinguished Visiting Professor and Academic Adviser of Collaborative Innovation Centre of Assessment toward Basic Education Quality, Beijing Normal University, China
- · Changjiang Scholar of Ministry of Education, China
- Distinguished Visiting Professor of Southwest University, China
- State High-End Project Foreign Expert of The State Administration of Foreign Experts Affairs
- Member of the Standing Committee, International Association for the Evaluation of Academic Achievement (IEA) (2007 – 2010)
- Member at Large of the Executive Committee, International Commission on Mathematical Instruction (ICMI) (2003 – 2009)
 Hans Freudenthal Medallist 2013

"Do your best, and God will do the rest!"

Professor Kam Biu LUK

1976 BSc graduate

- · Professor of University of California, Berkeley, USA
- Senior Faculty Scientist of Lawrence Berkeley National Laboratory, USA
- · Fellow of the American Academy of Arts and Sciences
- Fellow of the American Physical Society
- Hung Hing Ying Distinguished Visiting Professor in Science and Technology of HKU

"Pursue a dream with zeal but be flexible."

Professor Man Keung SIU

1966 BSc (General) graduate 1967 BSc (Special) graduate

- Retired Professor of Department of Mathematics, HKU
- Honorary University Fellow, HKU

"Teach the subject in order to nurture people, and nurture people through teaching the subject. One who is not tired of learning is not tired of teaching. There is no end to learning as there is no end to teaching."

> 「為教人而教書,由教書而教人。學而不厭, 方能教而不倦。學無止境,教無止境。」

Professor Yum Tong SIU

1963 BA graduate in Mathematics

- William Elwood Byerly Professor of Mathematics
 of Harvard University, USA
- Member of National Academy of Sciences, USA
- Fellow of American Academy of Arts and Sciences
- Foreign Member of Chinese Academy of Sciences
- Member of Hong Kong Academy of Sciences
- Member of Academia Sinica, Taiwan

"Like a mirror opens the half-acre square pond; reflected sunlight, cloud shadows play, stay, and bond.
O, tell me how can the water be clear like so? From the source a divine, live fountainhead does flow!"
(Zhu Xi, 1130 - 1200)
吉中生素《読書左尾》、「米執大体、祭問・玉米原影社社術家。

南宋朱熹《讀書有感》:「半畝方塘一鑑開,天光雲影共徘徊。 問渠為得清如許?為有源頭活水來。」





Distinguished Alumni with Exceptional Accomplishments in Their Professions



Dr Anissa Lai Kuen CHAN WONG 1980 BSc graduate

- Principal of St Paul's Co-educational College (2004 2017)
- Chairman of Task Force on Review of School Curriculum
- Founding Chairman of Hong Kong Principals' Institute
- Council Member and Honorary Fellow of The Education University of Hong Kong
- Member of Board of Governors of Centennial College, HKU

"It is easy in the world to live after the world's opinions; it is easy in solitude to live after your own; but the great man is he who in the midst of the crowd keeps with perfect sweetness the independence of solitude." – Ralph Waldo Emerson

Mr Peter Wing Leung LAI

1980 BSc graduate

- Financial Commentator
- Fellow of Hong Kong Securities and Investment Institute
- Fellow of The Hong Kong Institute of Directors
- Founding Voting Member of HKU Foundation
- Past President of Rotary Club Hong Kong North West
- Former Director of Pok
 Oi Hospital Board

Mr Yim Kwong CHAN

1966 BSc (General) graduate

- Senior Consultant of AXA China Region Insurance Co. Ltd.
- Founding Chairman of Hong Kong Life Underwriters Association and recipient of the first Industry Achievement Award
- Founding Member of Hong Kong Actuarial Association and Honorary Member of Hong Kong Actuarial Society
- Instigator and Founding Member of Hong Kong
 Insurance Industry Coalition
- Adviser in founding Faith and Global Engagement of HKU

"Apply scientific analysis in daily life practically and practicably." 「善用科學分析,融於實際生活」

"The secret of success in insurance is to know the language of the mathematics of money, the language of men, and the language of God."



Professor Paul Kwan Sing LAM

1982 BSc graduate; 1984 MPhil graduate

- Chief-of-Staff (Vice President) of City University of Hong Kong
- Director of State Key Laboratory of Marine Pollution, China
 - Chairman of Accreditation Advisory Board, Innovation and Technology Commission
 - Chairman of Advisory Council on the Environment (2010 – 2016)
 - Chairman of Marine Parks Committee, Country and Marine Parks Board (2005 – 2011)

"We're not obligated to succeed. We're obligated to do our best every day."

"It's always a happy experience to serve for the wellbeing of others."

Ms Oi Lin LEE

1970 BSc (Hons) graduate

- Former Deputy Executive Director of Vocational Training Council
- Founding Member and Past Vice Chairman of Hong Kong University Graduates Association Education Foundation
- Past Vice Chairman and Current Academic Adviser of Hong Kong Surface Finishing Society
- Founding member and Director of Police Married Quarters; Vice Chairman of Advisory Board
- Member of HK Institute of Construction Management Board

Mr Chee Kuen YIP

1981 BSc graduate

- Adviser of H₂OPE Centre, Water Supplies Department (2015 – present)
- International Programme Committee of Science Centre World Summit (2014 – 2017)
- Chief Curator of Macao Science Centre (2007 – 2012)
- President of Asia Pacific Network of Science
 & Technology Centres (2003 2005)
- Chief Curator of Hong Kong Science Museum (1998 – 2007)
- Curator of Hong Kong Space Museum (1993–1998)

"I do and I understand."



- Designated Deputy President and Provost of The Hong Kong Polytechnic University (PolyU)
- Vice President (Research Development) of PolyU
- Fellow of The Optical Society (OSA)
- Fellow of Institute of Electrical and Electronics Engineers (IEEE)
- Member of Council of Open University of Hong Kong



- Member of Research Grants Council
- Member of ASTRI University Advisory Council, Hong Kong Applied Science and Technology Research Institute (ASTRI)





Distinguished Alumni with Impressive Services and Contributions to Society

Dr Boon Ying LEE

1973 BSc (Special) graduate 1979 PhD graduate

- Former Director of Hona Kong Observatory
- Member of Hong Kong Meteorological Society
- Member of China Meteorological Society
- Fellow of Roval Meteorological Society, UK
- Member of Hong Kong Radiological Protection Society





Mr Kar Chun LO 1973 BSc graduate

- Member of Hong Kong Exchange Fund Advisory Committee, Hong Kong Monetary Authority
- Non-Executive Director of Securities and Futures Commission
- Chairman of Standing Commission on Civil Service Salaries and Conditions of Service (2006 - 2012)
- Chairman of Independent Commission on Remuneration for Members of the Executive Council and the Legislature, and Officials under the Political Appointment System of the HKSAR (2013 – 2019)
- President and Chief Executive Officer of Synnex Technology International (HK) Ltd. and Synnex Distributions (China) Ltd. (until 2013)

"Get the facts and do due diligence, never just assume or take things for granted."

Mr Jasper Yok Sing TSANG 1968 BA graduate in Mathematics

- Former President of Legislative Council
- Member of Court of HKU
- Vice Chairman of Hong Kong Policy Research Institute
- Convenor of Hong Kong Vision Research Programme
- Adviser of Democratic Alliance for the Betterment and Progress of Hong Kong
- Supervisor of Pui Kiu Middle School and Pui Kiu College

"Happiness belongs to those who have the courage to change what can be changed and the serenity to accept what cannot. Success belongs to those who have the wisdom to tell between the two."



- Chief Executive of Chinese American Professor and Professional Association, USA



Distinguished Alumni with Outstanding Services and Contributions to HKU

Professor Kwan Ming CHAN 1959 BSc graduate

- Professor Emeritus of California State University, Long Beach, USA
- · President of KMC Enterprises Inc., California, USA • President of Guang Dong Xin Hui Association, USA
- Director of Hong Kong University Alumni Association, Southern California, USA
- President of USA Chapter, HKU Science Alumni Association

"HKU Science, your boundless encouragement and guidance, surpasses the highest mountain; Hong Kong our hometown, our affection to you runs deeper than the ocean." 「港大理科,獎勵輔導,恩重崇山;香港我家,家園鄉土,親若深海」



Note 1:

43 Distinguished Alumni selected in 2009:

Professor Daniel Kwong On CHAN Dr Alison Lai Bing CHAN LAM Mr Wing Luk CHAN Professor Chi Ming CHE Professor Kai Ming CHENG Professor Patrick Yiu Chung CHENG Dr Nim Kwan CHEUNG Mr Stanley Yu Lun CHU Dr Timpson Shui Ming CHUNG Dr Margaret Wai Ling CHUNG Dr Rita Lai Tai FAN HSU Dr Stanley Hung Sun HO Mr Francis Suen Wai HO Professor John Ting Sum HO Professor Frederick Wing Huen HO Dr Hsing Tsung HUANG Professor Rayson Li Sung HUANG

Dr Wai Haan HUI Mr Ki Chi KWONG Mr Chiu Ying LAM Mr Colin Ko Yin LAM Professor William Ka Ming LAU Mrs Fanny Chiu Fun LAW FAN Dr Wing Tai LEUNG Dr Sarah Sau Tung LIAO Dr Anthony Tat Yin LUI Professor Clifford MATTHEWS Professor Malcolm PEAKER Professor Chung Kwong POON Dr Patrick Sun Cheong POON Dr Peter Tin Yau POON Dr Ambrose Shu Fai SO Mr Michael Ming Yeung SUEN Professor Samuel Sai Ming SUN Mr Chung Ding TAM Professor Sheung Wai TAM Dr Winnie Shuk Ming TANG Dr Carrie WILLIS Dr Chi Shing WONG Mr Kai Man WONG Professor Vivian Wing Wah YAM Mr David Yee Kwan YAM Professor Enoch Chien Ming YOUNG



Professor Kin Fai CHENG

1964 BSc (General) graduate; 1965 BSc (Special) graduate

- Emeritus College Principal of HKU SPACE Community College
- Former Professor in Chemistry of HKU
- Former Dean of Science of HKU
- Former Vice President (Academic) of Centennial College
- Fellow of Royal Society of Chemistry, UK

"Whatever you do, do it with all your heart. Be happy and do good."

HEAR FROM OUR ALUMNI

achievements with our alumni. Although our alumni may be scattered across various sectors, regions, and continents, we are proud that they are thriving in every part of society and in everything they do. Driven by our alumni's success, we have established a community in which we all belong, can stay connected and up-to-date, and be actively engaged.

So, we invite you to read some of our alumni's success stories; and while plenty have been shared, many more remain untold. Nevertheless, you will see how much our alumni have achieved and how the Faculty continues to nurture generations of science-literate graduates.

I am always thankful to HKU. So I was very happy when I had the opportunity to start giving support. 99

Dr Patrick Sun Cheong POON



- Datinguation Aura 2007
- · Chairman of Harvest SCP Group Co. Ltd.
- Court Member of HKU
- Council Member of HKU
- Deputy Chairman of Board of Directors of HKU Foundation
- Chairman of HKU Convocation Standing Committee
- Chairman of Advisory Committee of Lap-Chee College, HKU

Reinquistiond

Success comes from passion and lifelong learning. Dr Ambrose Shu Fai SO

- 1973 BSc graduate
- · Vice-Chairman and CEO of SJM Holdings Ltd.
- Director of Sociedade de Jogos de Macau, S A
- Consultant of Economic Development Council of the Macau SAR Government
- Committee Member of 9th-12th National Committee of the Chinese People's Political Consultative Conference
- Director of HKU Foundation for Educational **Development and Research**

Professor Chung Kwong POON 1963 BSc (General) graduate 1964 BSc (Special) graduate



- President Emeritus of Hong Kong Polytechnic University
- President of Hong Kong Polytechnic University (1991 - 2008)
- Dean of Faculty of Science, HKU (1983-1990)
- Appointed Member of Legislative Council (1985–1990)
- Gold Bauhinia Star
- Justice of the Peace
- · Recipient of Leader of the Year Awards (Education)

• Face the world with a thankful heart, and the grace will be all around you.



Not to be served, but to serve. - Matthew 20:28



Dr Winnie Shuk Ming TANG Danautrad LITTO 2009 1999 PhD graduate

- Founder and Chairman of Esri China (HK) Ltd.
- · Adjunct Professor of Faculty of Architecture, HKU
- Adjunct Professor of Department of Computer Science, Faculty of Engineering, HKU
- · Founder and Honorary President of Smart City Consortium
- Co-Founder and Board Member of eHealth Consortium
- Director of Asia eHealth Information Network (AeHIN)

66 To do good science, one must innovate and better, out-innovate others!

Professor Samuel Sai Ming SUN 1970 MPhil graduate

- Director/ Coordinator of the UGC-AoE Centre for Plant and Agricultural Biotechnology, Chinese University of Hong Kong
- Member of The International Eurasian Academy of Sciences (2008)
- Leader of the Year (Education/ Research) (2005)
- Member of The Chinese Academy of Engineering (2003)

Mr Chiu Ying LAM 1971 BSc (General) graduate BUTYS 2000 1972 BSc (Special) graduate

- Director of Hong Kong Observatory (2003 2009)
- · Vice President of the Asian Arm of the World Meteorological Organisation (WMO) (2003 - 2008)
- Honorary Fellow of the Royal Meteorological Society (2010 present)
- · Honorary President of HK Bird Watching Society
- · Co-author of the book Birds of Hong Kong and South China

Don't let your inquisitive mind die, otherwise life will get really boring.

Live present life fully and boldly.
(此時、此地、此身)

Mr Stanley Yu Lun CHU 1973 BSc graduate



- Founder and Chairman of the Adsale Group
- Honorary Life President of the Hong Kong Exhibition and Convention Industry Association
- Member of the Steering Committee on Meetings, Incentives, Conventions and Exhibitions of HKSAR
- Member of Tourism Strategy Group of HKSAR
- Founding Senior Member of the **HKU** Foundation



Rengement

Dr Margaret Wai Ling CHUNG 1980 BSc graduate 1987 PhD graduate

- Director and Biomedicine Consultant of Amazing Grace Holistic Health Care Centre, and GeneLife Biomedicine International Ltd.
- Chartered Chemist, Royal Society of Chemistry, UK
- Outstanding Women Entrepreneurs Award (2011)
- The 3rd Hong Kong Humanity Award, Red Cross (2010)

••• The positive thinker sees the invisible, feels the intangible and achieves the impossible.

Your academic and career pursuits can be two separate things. What truly matters is always follow your interest and goal, and enjoy the process. It is like a Chemistry experiment.

Renguered

Mr Wing Luk CHAN 1973 BSc graduate

Financial Commentator

Not to be served, but to serve. – Matthew 20:28 One has to bear this in mind and put it into practice.

Mr Ian Wai Nung CHU

1976 BSc graduate

- Member of the HKU Court (2009 2016)
- Member of the HKU Convocation Standing Committee (2007–2016)
- Member of the HKU Foundation
- President of the Hong Kong University Graduates Association (HKUGA) (2012 – 2014)
- Founding Director of the Global Universities
 Alumni Union (GUAU)
- Founding President of the Hong Kong
 International Hula Association



66 Being logical, realistic and truthful.

Reinguiltood

Dr Rita Lai Tai FAN HSU 1967 BSc graduate

- President of the 1st, 2nd and 3rd Legislative Council, the Government of HKSAR (1997 – 2008)
- Member of the Standing Committee of the 11th & 12th Sessions of the National People's Congress (NPC) (2008 – 2018)
- Council Member of the Hong Kong Laureate Forum



Ranguaried

Dr Colin Ko Yin LAM

1973 BSc graduate

- Vice Chairman of Henderson Land
- Development Co. Ltd.
- Chairman of Hong Kong Ferry (Holdings) Co. Ltd.
- · Director of The Hong Kong & China Gas Co. Ltd.
- Director of Miramar Hotel & Investment Co. Ltd.
- Silver Bauhinia Star Award (2017)
- Founder of Chi Wah Foundation
- Deputy Chairman of HKU Foundation

Use an objective mindset to respect the truth and nature.

Live your life to the fullest with kindness and compassion. Seek the truth with passion and diligence, and the truth will set you free.

Dr Peter Tin Yau POON 1963 BSc graduate

Renguened

- NASA/ JPL/ Caltech Technical Manager, Telecommunications and Mission Systems Manager, Project Manager
- Jet Propulsion Laboratory's Telecommunications and Mission Systems Manager for the Cassini-Huygens Mission to Saturn and Titan, 2001 Mars Odyssey Mission, Voyager Interstellar Mission, Mars Global Surveyor Mission and the NASA/ Stanford Relativity Mission
- Member of US Technical Advisory Group
- Executive Member of Institute of Electrical and Electronics Engineers
 (IEEE) Standards Committee
- Editorial Board member of Software Quality Professional

Sometimes life is hard and will not go as the way you expect, take it easy and smile.

Professor Frederick Wing Huen HO

Rating attact

- Adjunct Professor of Department of Statistics and Actuarial Science, HKU
- Occasional Statistical Consultant for United Nations, International Monetary Fund, World Bank, Statistical Institute for Asia and the Pacific
- Commissioner for Census and Statistics, HK (1992 2005)
- Statistics Adviser of National Bureau of Statistics, People's Republic of China (2006 2014)
- Silver Bauhinia Star by HKSAR Government (2006); OBE by UK Government (1993); and Spallart Medal by International Statistical Institute (1997)



 Talent is formed in solitude, character in the stream of the world.

Wolfgang Goethe

Mr Francis Suen Wai HO 1976 BSc graduate

- Overseeing the major transport infrastructure projects including the Hong Kong-Zhuhai-Macau bridge and cross-border high speed rail in Hong Kong (2007 – 2012)
- Introducing of digital terrestrial free television in Hong Kong (2003 – 2007)
- Formulating the first innovation and technology programme (including the Hong Kong Science Park, the Hong Kong Applied Science and Technology Institute, etc.) (1996 – 2007)
- Planning the first direct election to the Legislative Council in 1991
- Establishing the Environmental Protection Department in 1986

Dr Eddy Wai Choi LEE

1978 BSc graduate

- Previous positions as Senior Scientific Officer of Hong Kong Observatory, Assistant Curator of Hong Kong Space Museum, and Vice Principal of HKU Community College
- Chairperson of Hong Kong Science Fiction Club
 - Founder of 350HK (raising awarenes of climate change issue)
 - Awardee of Ten Outstanding Young Persons Selection 1985

Expand your thoughts, and you enlarge your world.

Reinquerhood

Mr Kai Man WONG

1972 BSc (General) graduate in Physics and Mathematics 1973 BSc (Special) graduate in Physics

Try not to become a man of success but rather try to become a man of value.

- Albert Einstein
- Justice of the Peace
- Bronze Bauhinia Star Award
- Management Board, Head and Founder of Capital Market Service of PricewaterhouseCoopers
- Independent non-executive directors of 5 listed companies and 1 bank in Hong Kong
- Honorary Fellow of HKU, The City University of Hong Kong, Lingnan University

Do not bang your head against the wall!

Professor Kai Ming HO

1972 BSc (General) graduate 1973 BSc (Special) graduate

- Professor of Iowa State University, USA
- Associate of Division of Materials Science & Engineering, The Ames Laboratory, USA
- Senior Scientist of The Ames Laboratory
- Distinguished Professor in Liberal Arts and Sciences, Iowa State University
- Fellow of American Physical Society



In God's light we shall see light.



Dr Wing Tai LEUNG

1972 BSc graduate

- President of Lumina College
- Ministry Adviser and Former General Secretary of Breakthrough
- Honorary Fellow of City University of Hong Kong

Ranguarhed

Honesty, ethics, integrity and professionalism.

Dr Nim Kwan CHEUNG

1969 BSc (General) graduate in Physics and Mathematics 1970 BSc (Special) graduate in Physics

- Vice President of Telcordia Technologies
- Consulting Professor of Stanford University, USA
- Chief Executive Officer of Hong Kong Applied Science and Technology Research Institute (ASTRI)
- Council Member of Research Grants Council of Hong Kong



For full version of all stories, please visit: http://www.scifac.hku.hk/ alumni/science-family Be inquisitive - raise more questions as not every belief is correct.

Professor Johnny C L CHAN 1974 BSc graduate 1976 MPhil graduate

- Dean of School of Energy and Environment, City University of Hong Kong (City U)
- Chair Professor of Atmospheric Science, School of Energy and Environment, City U
- Director, Guy Carpenter Asia-Pacific Climate Impact Centre (GCACIC)

Once you put your mind to something of great interest, just trust yourself, be brave, be adventurous, and do your best.



Professor Patrick Yiu Chung CHENG

1963 BSc graduate

- Former Vice-Chancellor of HKU
- Founding President of City University of Hong Kong
- Member of the Chinese Academy of Sciences
- Justice of the Peace

Learn character from trees, values from roots, and change from leaves.

Tasneem Hameed

FROM CLASSROOM TO THE WORLD

Enriching Students' Learning Experiences

LEAF

Students as leaves to collect strength

DIVERSE LEARNING EXPERIENCES ARE SUSTENANCE FOR NEW LEAVES

Leaves require sustenance to grow lush and vibrant. As new leaves at the top of our mighty oak tree, our students are given ample learning opportunities to pursue according to their personal interests and aspirations. The world is wide open for them and the horizon is endless. We want our young generation to experience all manner of different forms of learning, stay hungry and excited for knowledge, grasp every opportunity to immerse themselves in new cultures, keep chasing the horizon, and live life to the fullest.

ONCE-IN-A-LIFETIME EXPERIENCE

BEYOND THE CLASSROOM

xperiential learning is a distinctive feature of the Undergraduate Science curriculum. By engaging in capstone projects and other hands-on learning, the Faculty strongly encourages students to extend their learning experience outside the traditional boundaries of the classroom, facilitating a holistic understanding of authentic issues. We believe such a method will benefit students by enhancing not only their insights into the real-world workplace environment but also their capabilities — integrating theory with practice, broadening their global outlook, and developing their social and cultural values.
 We hope that strong leadership skills will also be developed and that these experiences will be valuable gifts in their personal growth.

POWERFUL FORMS OF LEARNING

require students to tackle real-life issues by drawing on the theoretical knowledge learnt in their respective disciplines. These firsthand experiences will also sow the seeds for their future career paths, inspiring them to live a unique way of life.



GO EXPLORE THE WORLD

ncountering new countries and gaining fresh perspectives across boundaries can be both fascinating and inspiring. In line with the University's strategic initiatives of nurturing global citizens, the Faculty has enhanced the provision of a variety of both local and overseas/ mainland learning activities for undergraduate students to expand their horizons, with the target of achieving 100% overseas and mainland China undergraduate experiences by 2022.

In 2018–19

- > 581 science students took part
- > 120 partners from 26 countries
- > 20 types of overseas/ mainland China learning activities

able Alternative.

HEAR FROM OUR STUDENTS



Summer Does Not Have to be Boring!

Mr Benjamin Chun Hei MAN

- BSc student (major in Geology, minor in Music)
- Participant of Vancouver Summer Programme at University of British Columbia in 2018
- HKU Student Ambassador
- Science Student Peer Adviser

"I participated in the Vancouver Summer Programme offered by the University of British Columbia the summer after my freshman year at HKU. My purpose of going to this month-long summer programme was to help me decide whether Geology was the major I should pursue. Looking back, I could confidently say that it was one of the best decisions I have ever made.

> One of the biggest challenges I faced was not the language, but was rather the integration and adaptation into the urban lifestyle of Vancouver.



My most unforgettable moment was meeting Justin TRUDEAU in real life during the Pride Parade, but having our professor buy thirty tequila shots for the entire class also came a close second! Another hilarious moment would have to be walking an hour back to campus along the highway near midnight and having an entire pizza accidentally slip out of the box!

As much as it sounds like a cliché, going on a summer exchange was by far one of the best decisions I have made so far. I would probably still be stuck pursuing a subject I had zero interest in if it was not for this opportunity!

Vancouver

All the above not only constituted a precious experience filled with fun, but more importantly, it helped me decide my major; and during my stay there was no pressure on GPA or full course commitment, I could truly study for myself and my interest. I was able to enjoy the course alongside all the things Vancouver had offered and also had a great summer holiday."

Oxford Experience - Learning from Prestigious Institution and Scholars

Miss Judy SHAO

- BSc student (major in Biochemistry)
- Participant of Young Scientist Scheme (YSS)
- Participant of Oxford Pembroke Junior Year Abroad (JYA) Programme in 2018–2019
- Participant of Summer Research Fellowship (SRF) in 2017 and 2018

"For me, spending my third year in Oxford has been an invaluable experience. I decided to join the programme due to the vast difference in science teaching between HKU and Oxford; whereas the former provides freedom for self-study and involves little writing, the latter focuses on individual attention on extensive essay-writing practices. This difference had presented challenges as expected, and l was overwhelmed by the efforts required to produce a good essay piece. Yet, it felt worthwhile when I received high praise from my Oxford tutor for my first-ever biochemistry essay; getting recognition from such a prestigious institution was truly encouraging, rewarding, and most unforgettable.

This experience was an exploring process. Living in Oxford beside the River Thames (and, exciting enough, across the road from the famous hall in Harry Potter) had given me a chance to savour the unique British beauty; living among Oxford students, spending Christmas and matriculation with them opened my eyes to British culture. Most importantly, I got an opportunity to contrast academic styles and explore what was more suitable for me. Interestingly, I found myself to work better when I organised my own time; I believe this serves as invaluable reference for my choices for future postgraduate studies, and thus I am truly grateful for my experience this year."

> Oxford is a place of challenge, exploration, and search of future. My year living in this picturesque city with a strong British culture has been most enjoyable and rewarding.

Finding Creative Solutions to Problems at Premiere Student Competition

Mr Kenneth Tsz Chun NG

BOSTON

lassachusetts 🥆

- BSc student (major in Molecular Biology & Biotechnology, minor in Biochemistry)
- Listed as Gold Medallist in International Genetically Engineered Machine Competition (iGEM) in 2018
- Participant of Business Immersion in Philippines in 2017
- Global Volunteer in Peru in 2017
- Summer Exchange at George Washington University in 2016
- Summer Exchange at Peking University in 2016

"As a foundation promoting the advancement of synthetic biology and the development of an open community and collaboration, the International Genetically Engineered Machine Competition (iGEM) offers a high degree of freedom and autonomy for students amid their exploration of the wonders of synthetic biology.

The experience did not only allow me to learn more about techniques in research, but also rekindled my passion for science as well. As a team, we built genetically engineered system for an identified problem and devised experiments accordingly. The complexity of the project, as well as the autonomy, provided a robust learning environment for our team. Failing experiments countless of times made us more flexible researchers. The fun part of iGEM was to learn and joke around with teammates in the lab, and nothing compares with the joy.

The most memorable moment happened to be the time when we saw HKU was listed amongst Gold Medallists — we were so thrilled and excited. We also got chances to venture out of the campus of some of the most renowned universities in the world, such as Massachusetts Institute of Technology (MIT) and Harvard University.

Allowing young researchers to find the pure joy of conducting research in a setting without limitations and boundaries, iGEM is undoubtedly an excellent start for students to embark on a research career."

Constraint kills the fun of doing research. University is about the freedom it offers, and iGEM provides a perfect kick-start of a research career.

Miss

2018 BSc graduate (major in Geology, minor in Geotechnical Engineering)
Participant of regional field study entitled "Deconstructing the anatomy of the arc-continent collision system in Taiwan"

"Despite having frequently heard about hot springs and earthquakes in Taiwan from the media, the field trip was my first time being able to closely investigate the story behind. As Taiwan lies in a special location — along the boundaries of two active plates, many unique rock features which are absent in Hong Kong can be found there. This experience was exciting, especially when we had the chance to look closely at a representing rock feature that I had only read about it in books yet had never seen before. This field trip has undeniably given me a valuable opportunity to integrate what I have learnt in lectures, enhancing my understanding of different geological processes. It also allowed me to learn through interactions with nature, to feel the genuine power and the beauty of our dynamic planet Earth, and provided me with knowledge beyond books."



Equipping an Intellectual Mind through Overseas Research

Witnessing the True Beauty and Dynamics of Our Earth

liss Joycelyn Wai Hang TAM

Joining the field trip to Taiwan was like unveiling the incredibly mesmerising face of our neighbouring island.

What you have planned is more important than what you have prepared.

Mr Pok Man HO

be a flexible researcher.

- BSc student (double major in Ecology & Biodiversity and Earth System Science)
- Exchange study and Overseas Research Fellowship at Australian National University in 2017–18



"It was not until my exchange study at Australian National University that I was aware of my strong interest in bioinformatics research. I joined a research group there which I later found my interest lie in computational biology. This experience drove me to explore research further via the Faculty's Overseas Research Fellowship (ORF) scheme, and I was excited to see my research on computational ecology developed in Australia being accepted as one of the ORF projects.

Doing research is way far different from working on course projects. If I had to choose a good analogy, I would say it is like sailing in a wide open and endless ocean than in a harbour. From the ORF project, I learnt the importance of making back-up plans, given the unpredictable environment. From my learning of different software, I got to know the diversity of their efficiency, resolution, accuracy and most importantly, how to

One important lesson I have learnt at ORF is to 'keep calm and fix problems'. From there, I have learnt how to embrace and tackle challenges. Learning out of the classroom is always an invaluable experience to enhance one's knowledge and skills. It has nothing to do with GPA, but authentic and hands-on experience for the workplace."

nustralia

My fruitful experience at Nishina School has ignited my interest in pursuing research in nuclear physics.

An Eye-opening Experimental Learning of Nuclear Physics

Mr Marco Tik Tsun YEUNG

- BSc student (major in Physics, minor in Chemistry)
- Participant of Young Scientist Scheme (YSS)
- Participant of Nishina School at RIKEN, Tokyo in 2018
- Participant of Summer Research Fellowship (SRF) in the field of nuclear physics in 2017

"Participating in the Nishina School at RIKEN was very exciting, as the first named element in Asia 'Nihonium' was discovered there, and the experiences had come far beyond my expectation. I was first astonished when I visited the advanced large-scale facility which cannot be found in Hong Kong. It is indeed a huge effort spent in modern experimental physics that impresses all.

We spent a week working on an interesting project at an accelerator facility. This was my first hands-on experience of an ion beam experiment. Although we encountered numerous difficulties along the way, we were all able to present our findings after working with other group-mates and consulting teachers, and that was truly satisfying. The most unforgettable part was the interactions and engaging discussions among students and teachers, which enhanced my problem-solving skills. I also learnt how to operate detectors under the guidance of teachers.

> Cultural exchange with students from different countries was another fascinating part of the programme. We shared our academic and day-to-day experience of our home towns, and became friends."

What I had seen in the survey was untouched by tourism and it gave me the experience of a lifetime.

PHILIPPINES



"The Gallant Ho Experiential Learning Fund generously funded me and a team of 12 people to work on a project about underwater surveys, sharks and manta ray conservation. We collaborated with a National Geographic Explorer and went to Palawan, Philippines to learn about manta activities.

As a student of ecology, nature conservation and scientific research are key aspects of my undergraduate education. The opportunity to apply conservation theory to create surveillance tools and see its immediate effects was too good to pass, and I am extremely glad that this project happened. Aside from building an underwater camera, we snorkelled in clear deep waters off the northern edge of the island, where we saw rays and floated mere centimetres above huge mounds of coral. The experience of snorkelling in open water is definitely not one I am going to forget soon.

The project gave me key skills like logistic handling, time management, and leadership qualities, which I have always been hesitant to pursue. Coordinating schedules and meetings for 12 people was at times a nightmare, but it taught me how to overcome my fears about handling problems."





Grow and Transform, for Oneself and the World

Miss Saumya GUPTA

 BSc student (major in Ecology & Biodiversity (Intensive)) • Participant of the project "Shark Trek" in Philippines



Mr Jacky Ka Kiu CHU

- BSc(ActuarSc) student
- Peer tutor of Department of Statistics and Actuarial Science in 2019
- Exchange study at Queen Mary University of London in 2018



"At the time I applied for exchange study at Queen Mary University of London (QMUL), I was just expecting a half-year break in UK and some other European countries. It turned out to be a much more fruitful and life-changing experience.

The deepest insight I have gained is that in order to learn the most valuable lesson, you need to step out of your comfort zone. I grasped every single opportunity to try new things in the journey - cooking, serving as volunteer and travelling alone everything you can name. I was a bit hesitant whenever I tried something new, but as time went by I began to feel more comfortable with new attempts. I started to understand that one will never make his story interesting if he chooses to stay on the treadmill - from taking solo trips, I explored cities from my own perspective and choice; from the volunteer work, I connected with like-minded people and engaged in meaningful and fun projects; from the enthusiasm of QMUL students I met at classes, I saw a different attitude in learning - being proactive and expressive in tutorials can actually be guite rewarding and motivating. Indeed, the vibrant studying environment endowed a new meaning to learning, which I found inspiring and beneficial to my study afterwards."

Take risks in life that seem worth-taking and make your stories worth-telling.

100 -

I ETTTTT I





Mr George Yin Pok WONG

- BSc student (major in Chemistry)
- Participant of Young Scientist Scheme (YSS)
- Exchange study at University of California (Berkeley) in 2019
- Participant of Summer Research Fellowship (SRF) in 2017 and 2018

"I was to gain a couple of undergraduate research experiences in HKU within the field of inorganic chemistry and nanotechnology. While these experiences were short, the exposure to the research environment taught me a plethora of practical skills that I would not be able to learn solely from lectures. By setting up chemical reactions, conducting experimental measurements, reading scientific papers and participating in group meetings, I could truly understand how a research group functions.

Being in the lab was a constant learning experience with some ups and downs. There were times where experiments could fail horrendously, especially when my measurements did not display my target product, but it was vital to pick yourself up and figure out what was going on. By overcoming these mini challenges, I was able to grow maturely as a person and become increasingly perceptive in conducting research work.

All in all, it was incredibly enjoyable to see how my work was able to create new knowledge which can contribute to the research community. Actively engaging in research activities convinced me that being a scientist is the coolest thing that a person could ever do for a living, and I would like to continue to pursue this path in the future."

The experiences at lab did not only broaden my horizon, but also allowed myself to develop into a more mature person with a greater enthusiasm for pursuing scientific research.





Never Too Trivial — Intern Can Also Make an Impact to Society

Miss Ka Yi LEUNG

- BSc student (major in Biochemistry, minor in Molecular Biology & Biotechnology)
- Summer intern at Advanced Technology Section of Identification Bureau. Hong Kong Police Force in 2018
- Summer student research assistant at Department of Chemistry of HKU in 2017

"Working as an intern at Advanced Technology Section (ATS) of Identification Bureau definitely added colours for my summer in 2018! What inspired me to give it a try for this internship was actually a Common Core Course about forensic science. The use of vital tool and practices in the search for the truth allowed me to detect fingerprints, shoeprints and to analyse blood stain pattern. Such hands-on experience at a real forensic laboratory deepened my interest in the area.

My responsibility for the internship was to compare different fingerprint detection techniques with validated research findings, of which the outputs might shed light on developing the most ideal detection method for the associated party to adapt as daily practice in the future. I was grateful to be a part of the team and contributed to the project with my scientific knowledge and laboratory skills learnt at HKU.

There was much to learn from this internship – it was splendid to learn using forensic light sources and taking professional photographs of fingerprints, whereas the most challenging part was to manage a huge sample size for experiments under a tight schedule. As saying goes 'pressure makes diamonds', the stress I faced did make me stronger. I still remember the satisfaction of getting tasks done successfully and the compliments from my supervisors - all gave me a strong sense of accomplishment.'

Unfolding the mystery of fingerprints in forensic lab is genuinely a valuable experience to me, making me know that my efforts could also make an impact to society.

A Taster's Experience that Prepares Talented Students for Research

Mr Samson Wing Ming CHEUNG

• BSc student (major in Food & Nutritional Science) • Participant of Summer Research Fellowship (SRF) in 2017 - 2018

"Have you ever imagined yourself as a renowned and erudite scientist who invents things that make our community better? I did when I was small. Being curious to scientific research, my mind was always filled with questions: What is the life of a scientist like? What kinds of research projects are conducted here at HKU? To answer these questions and to realise my childhood dream, I decided to have a taste in research through Summer Research Fellowship (SRF) scheme in the summer of 2017, under the supervision of Dr Chi Bun CHAN at School of Biological Sciences.

Practising is quite a different thing from learning from books. Stepping out of classroom, I encountered countless difficulties at the very first beginning, from handling equipment to experiment design. Research is definitely no easy task and we usually neglect the great efforts devoted behind every incredible discovery. With the inspiring and encouraging atmosphere in Dr CHAN's lab, I started to dedicate myself to scientific research. It was an incredible learning experience that greatly sparked my interest and curiosity in science."

> **F** Summer Research Fellowship did not only give me knowledge, but also a glimpse at the beauty of scientific research.

One Crucial Step towards Independence

Miss Anna Sze Wai TSE

- BSc student (major in Molecular Biology & Biotechnology, minor in English Studies)
- Participant of Young Scientist Scheme (YSS)
- Participant of HKUWW Undergraduate Student Exchange Programme for a full-year exchange to the National University of Singapore in 2018–19
- Listed as Gold Medallist in International Genetically Engineered Machine Competition (iGEM) in 2018
- Participant of Summer Research Fellowship (SRF) in 2016 and won the Best Presenter Award in the poster presentation

"I was on a full-year exchange at the National University of Singapore under the Young Scientist Scheme (YSS) in 2018-19 and worked on a project on rice genetics at Professor Hao YU's lab during my exchange. From my lab mentor and seniors, I learnt how to cope with challenges related to my research project and the frustration that came with failed experiments, as well as skills from handling maintenance in my dorm to choosing the best data plan - things that would allow me to lead a better independent life. I stumbled a lot along the way and made my fair share of mistakes, but all these have forced me to improve and to become a more all-rounded person who could support herself both inside and outside the lab after this year."

> Throughout my year at National University of Singapore (NUS), I made countless mistakes in the lab and in life. Each of these 'failures', while painful, was crucial for shaping me into a more independent and all-rounded person.



Miss Hody Ho Yu LEE

- BSc student (double major in Biochemistry and Psychology)
- Participant of Career Success Programme in 2018-19

"Career preparation is truly more important than many of us realise, especially for final year students like me, acquiring presentation skills is definitely an advantage to develop my future career. The Career Success Programme equipped me with such skills, enabling me to explore my aspirations and possible paths ahead.

Equal emphasis is placed on resume-polishing in the workshop. It was really practical and useful for I could easily apply the techniques in preparing my interviews or even in dailv life.

F Having a career plan is vital to one's career success. It also helps me through my lifetime.



The personality test conducted also made a great part in my career preparation training. The test result gave me a clue to understand myself from a different perspective. With a clearer understanding of my personality, possible occupation direction and potential career paths are then suggested for me in the analysis, bringing me more insight in pursuing my career.

Among the different workshops in the programme, I found the one discussing how individuals of disparate personalities react in different real-life scenarios most inspiring. The study of these authentic cases allowed us to have some reflections on our own selves and understand any incongruence between the 'real me' and 'portrayed me'. To me it was a valuable self-exploring journey, facilitating me to start a new chapter in life."



Mr Hugo Chin Leong WONG

- BSc student (major in Chemistry)
- Research assistant for Dr Angela Pui Ling TONG, re-designing experiments for Chemistry education in 2019
- Participant of Summer Research Fellowship (SRF) in 2018
- Research helper at Dr Ho Yu AU-YEUNG's lab on synthesis of interlocked rings in 2018
- Research helper at Dr Patrick-Henry TOY's lab on organocatalyst in 2017

F Sometimes research looks scary from outside, but you will find it appealing to be around when you get to know it.

"It was really a fruitful experience for me to partake in Summer Research Fellowship (SRF) in the summer of 2018. I had long been passionate in Chemistry and involving in its research, and through joining SRF, I was able to have an early taste of research before my postgraduate studies.

In my first year summer, I had been a research assistant in design and synthesis of organocatalysts. I started to realise the attractiveness in doing lab and I would like to dive myself deeper into Chemistry research. Thus SRF seemed to be very appealing for me such that I could launch a whole project by myself.

My SRF topic was about synthesis of interlocked-molecules. Although the synthesis was unsuccessful in the end, after the SRF scheme, I could see my progress in acquiring knowledge about supramolecular chemistry and equipping myself with lab techniques. Unlike attending lectures and reading textbooks, we should proactively find out the solutions by our own. To me this experience was also a golden opportunity to enhance my problem-solving skills. Despite the failure I experienced, I found myself fully dedicated to Chemistry research and felt fruitful in that summer. I would also like to thank my supervisor as well as the postgraduate students who provided much guidance to me. In the future, I will definitely seize every opportunity and keep going for research-related experience."



A Summer of Tracking the Global Economy

Mr Leo LIANG

- BSc student (double major in Statistics and Economics)
- Yale Herb Scarf Summer Research Opportunities (HSSRO) and HKU Overseas Research Fellowship (ORF) in 2017

"The Yale Herb Scarf Summer Research Opportunities (HSSRO) requires participants to work as research assistants for Professors at the Department of Economics of Yale. Co-supervised by both Yale and HKU Department of Statistics and Actuarial Science (through the Overseas Research Fellowship scheme, also known as ORF), I spent my summer in 2017 to explore the factors behind the global trade collapse and subsequent recovery during the Great Recession.

Without much prior experience in economics research, I was expecting to make 'ground-breaking' discoveries with just a few taps in software or equations in my research project at Yale. To my dismay, one of my first tasks was data cleansing and visualisation. It turned out that in research, patience was essential. Before rushing into the complicated economic indicators, we had to read through the documentation of data collection and organisation, for the clarification and accurate interpretation of concepts. After that, small treatments to data were also critical, and sometimes we might spend days figuring out the exact calculation. Mundane as it might seem, working on the data gradually led me to better understand the economic concepts better; and understanding of the data available later became a source of inspiration when additional research topics were considered.

As we continued. I became more and more aware of the similarities between research and story-telling. There can be numerous ways, many of which are correct, where one can combine and present data. Therefore, finding the right perspective to approach, analyse, and illustrate an argument is crucial. Every time, as I was waiting for the computer software to visualise some newly defined or calculated variables, it felt like digging into an unknown cave of treasures."

I am not throwing away my shot" – from Hamilton the musical.

Yale University



Diving into the World of Coral

Miss Jolene WONG

 BSc student (major in Environmental Science) Participant of ENVS3022 Environmental Science Field Course

"Okinawa is not merely a place for travel, it is indeed a perfect place for us to explore the beauty of the ocean. During my field trip there, my team and I went out to the sea for coral sediment sampling. Even though I was not the one who actually dived to do the sampling, I was still able to snorkel around to admire the beauty of corals as well as play with the herds of soldier crabs.

Before the field trip I was a total stranger to corals, yet through intensive lab work, I became an 'expert' by being able to identify the most abundant species Acropora coral! The transformation was a great accomplishment for me and I will never forget the beauty I have witnessed."

Cornell



Early Research Experience Paves Way to Career as Researcher

Miss Xueyan NIU

- BSc student (major in Mathematics, minor in Cognitive Science)
- Participant of Overseas Research Fellowship (ORF) at Cornell University in 2018
- Participant of Summer Research Fellowship (SRF) in 2017

Having a taste of research at Cornell, I got inspired and am determined to pursue my future research in US.

F I would never forget the beauty of coral

I had witnessed in the field trip.

"Without the financial support of Overseas Research Fellowship (ORF) scheme, my summer might just be another ordinary one. My research project took place at Cornell University, a place which welcomes intellectual minds from all over the world to visit and exchange ideas.

I had a wonderful time at Cornell, where I accomplished a full-cycle research on the Mathieu equation and its extension to infinite fractafolds. Working with one of the best professors in fractal analysis and a bunch of dedicated teammates, I gained a precious research experience with the most rewarding outcome - having the chance to publish a journal paper on the project. I was also attracted by the peculiarity and inclusive research environment of the US, and am determined to pursue graduate studies there in the future. I believe this unique and authentic experience is very helpful for my application of graduate school, and I am honoured to be part of this fellowship."

Yet the smallest acorn may become the tallest oak. Robin Jarvis, The Oaken Throne

FROM PRESENT TO FUTURE

Developments over the Next Decade

ACORN Fruitful acorns sowing seeds for future development

ACORNS AS THE SEEDS OF A GREAT FUTURE

"The creation of a thousand forests is in one acorn", wrote Ralph Waldo Emerson in his essay "History". Turning the pages of this 80th Anniversary Commemorative Volume, it is easy to be caught up in search of that thread, which runs from the early impressions of our Northcote Science Building on Pokfulam Road to the future Science Building at No. 2 University Drive. The past is full of grand stories and flurries of activity, reflecting the significant experiments and breakthroughs which have brought us to where we are now, and where we will be going. From little acorns do mighty oaks grow.

AMBITIONS AND PROGRESS OF THE 5-YEAR PLAN



U ir goal for the Faculty of Science's 5-year Plan is clear: to adapt to the shift in world knowledge, maintain our lead position, and build on our strengths to produce a multiplier effect. The Plan is neither brand new nor built from scratch. Formulated in 2017, it outlines how we can harness the energy and strengths in realising the 4 strategic moves of **"GEAR"**: growing academic staff, enhancing research leadership, augmenting the student experience, and revitalising equipment and infrastructure. The interwoven initiatives highlight the Faculty's dedication, distribution of resources, expertise, and engagement to our goals year-round.

"The Faculty has achieved a great deal throughout its history and is in a good shape. It has extraordinarily successful individuals and is well-renowned in areas such as chemistry, condensed matter physics, and geoscience, etc. I would like to go a step further, build on that excellence, and find a common cause amongst various colleagues," remarked the Dean of Science, Professor Matthew R EVANS, who is committed and engaged with as many parts of the Faculty as possible. Finding a way to "turn the page" as it were, he clearly sees the values of the 80-year Faculty. "While at the same time strengthening our research leadership position and becoming pre-eminent in Hong Kong, we also aim to be the leading university in Asia and highly competitive among the renowned institutions of the world. As a premier university, we really should be at the top of our game." Nevertheless, these aspirations need to be more than just slogans on a wall. In 2017, Dean EVANS announced a 5-year Plan to map out the Faculty's strategic moves. "The plan contains a number of aspirations. Among them is to bring to the University the highest quality academic staff with a range of diverse profiles, set up 6 Research Divisions to enhance research leadership, build a new Science Building that will house central facilities and some of our top research groups, and to upgrade our curriculum to ensure that the best quality teaching programmes are being delivered," he said. As such, we are systematically creating more opportunities for each member of the Faculty.

> Cur longer-term aim is to sustainably establish the Faculty as one of the leading science faculties in Asia.

> > Professor Matthew R EVANS Dean of Science

GROWING ACADEMIC STAFF





ndeed, part of the plan has already been realised, with the 80th Anniversary Recruitment Exercise being underway. We aim to maximise the benefits of research by advancing fundamental knowledge and contributing to future research agendas in certain specialised areas. **"The Faculty** is in a phase of boosting quality research output, and around 30 academic staff members have been recruited to strengthen the Faculty as part of the rigorous 80th Anniversary Professorships recruitment exercise," said Professor EVANS. By bringing in new and vibrant researchers with an abundance of experience, the Faculty hopes to strengthen and broaden its teaching and research outputs. While it may seem to many as though research and teaching are in different spectrums, we believe that only a professoriate staff engaged in frontier research can deliver the most up-to-date knowledge in the classroom. **"For all their extraordinary intellectual** capacity, energy, and range, our colleagues will no longer lead compartmentalised lives with little integration between the different spheres of their work. We will foster young talent and attract distinguished researchers by providing them with the rich soil for creative solutions and innovations to blossom," Professor EVANS explained.



Ur equipment and research support infrastructure will be improved, with a view to further facilitating interdisciplinary work. "Addressing needs in both hardware and software means that more ideas and dynamic interactions are expected," said the Dean. The Faculty will also play a visible role in "connecting the dots" by strengthening links between research, knowledge-transfer activities, innovation, and business engagement through regional and international partnerships. "Many of our researchers are already engaged in such boundary-crossing projects and the Faculty is seeking to formalise these links where possible," the Dean elaborated.

The centrepiece of our efforts has been the creation of 6 Research Divisions, designed to provide the backbone for maximising research performance, identifying and nurturing research strengths, and incentivising research activities. Together with a high level of commitment and dedication from our colleagues, our research strengths and potential will be unleashed to exert profound and long-term impacts, benefitting mankind with innovative research and scientific training.

AUGMENTING STUDENT EXPERIENCE

ther than benefitting from our own research advantages, we would also like to seize the opportunity to nurture talented young students," Dean EVANS explained. To that end, the Faculty created the option for a Minor in Science Entrepreneurship. It also actively participates in the development of the Bachelor of Arts and Sciences (BASc), whose students take courses on themes revolving around global grand challenges. The world is constantly changing and the future of higher education might be radically different from how it is today. To keep up to date, we have to be flexible. Science education should not be solely confined to just nurturing future scientists, it should be much more than that.

We prepare students to become thoughtful and engaged citizens in a complex and pluralistic world. We encourage students from diverse majors to come together and solve both real and abstract problems. The goal is to allow them to gain a depth of expertise in a particular field of study and also a breadth of knowledge across multiple disciplines. Students will also develop the necessary social skills to collaborate with people outside of their fields.

This way, we can define the "impact" of science education in a broader sense by cultivating a scientifically literate population. This could have an intangible effect on society; perhaps in the form of policies, scientific mindset, logical thinking, or other qualitative skills. **"I do not want students retreating into their in-boxes. University education is about broadening** the way we do things. We want to make sure that our students get in touch with the frontiers of knowledge when they join our Faculty, and get to know that there is a broad spectrum of ways to discover knowledge, as well as disseminate it to the people around them. Interdisciplinarity is an expression of the teaching-research nexus. It does not have boundaries, it is infinite," emphasised Dean EVANS.



REVITALISING EQUIPMENT AND INFRASTRUCTURE

nfrastructure is the crucial physical foundation which allows the Faculty to be at the forefront of research and teaching. As such, the design and planning for the new InnoScience Hub in the Tech Landmark is already underway. The world is becoming more complicated every day, and newly emerging problems pose regular challenges. More and more frequently, multiple disciplines are starting to work together to accelerate transdisciplinary knowledge and propose collective solutions. Therefore, scientists need support when testing their ground-breaking hypotheses. To excel in such a global arena, the Hub will accommodate all the central facilities and be designed to inspire collaboration and creativity across disciplines. **"It will serve as an open collaborative space to facilitate intellectual minds to exchange ideas. Synergy between multiple disciplines is expected to foster cross-fertilisation of innovative ideas, the development of new research areas and unique interdisciplinary**

projects, research excellence, and enhanced visibility on the world map," explained Professor EVANS, visualising the development of the Faculty over next few years.

"The InnoScience Hub will have state-of-the-art learning and research facilities (including undergraduate teaching laboratories) that greatly increase our capacity to lead the world in our primary research areas, and create an environment which challenges our students to address new issues in the field," said Professor EVANS. Research is the crux of our advancement, yet to sustain our leading research position, nurturing the next generation is of vital importance. We hold to the belief that talented young scientists will benefit and be intellectually nourished via academic interaction at the Hub. Through a cross-disciplinary joint effort and a successful research culture, we will endeavour to impact society at large.

Contrast.

VIDEO

CONFERENCE

TOGETHER, WE CREATE LASTING IMPACTS

he 5-year Plan is a roadmap for a range of far-reaching goals. Built on 8 decades of experience, it sets out our collective vision, purpose, goals, and strategies for the years ahead. We are not a complacent Faculty that simply relies on existing strengths, we aspire to achieve our vision and catapult ourselves into greater visibility in the global academic arena. We are committed to excelling in both teaching and research by grasping the opportunities and facing up to the challenges. With the introduction of the plan, the Faculty will have profound impacts in the long-run.

EXPANSION OF SWIMS OPENS UP POSSIBILITIES AND OPPORTUNITIES

The way of doing Science is dynamic. Enhancing our infrastructure and acquiring different skill sets are crucial for us to cope with the future, by means of research and outreach.

> Professor Gray A WILLIAMS Director of SWIMS



cience is ever-evolving, and with discoveries comes new theories, ideas, and insights. However, this evolution cannot be sustained without constantly upgrading the infrastructure. Since its inception in 1990, the Swire Institute of Marine Science (SWIMS) has been

a driver of advances in both marine biology and ecology in Hong Kong and the surrounding region. After nearly 3 decades since its launch, the time has come for SWIMS to modernise and keep up with the times. As we speak, construction of a new laboratory annex, as well as extensions to the existing residential blocks are well under way.



Vision beyond Expansion

Forming an L-shape with the existing main building, the new laboratory block will comprise a molecular biology lab, a biodiversity centre, and an expanded seminar room, as well as provide the necessary space for new staff and research students. **"It is hoped that through the addition of new facilities, SWIMS will be able to host more researchers from around the** world and maintain its leading



role in marine science research; while catering to the growing interest in local marine ecology and biodiversity being developed by citizens in Hong Kong," said Professor Gray A WILLIAMS, Director of SWIMS, visualising the blueprint of the expansion project.

"It is the growing number of researchers that has stimulated the expansion. When the Swire Marine Laboratory opened in 1990, it was actually quite small. We officially became SWIMS in 1994, at which point the lab doubled in size. We underwent another renovation in 2003, but since then, our numbers have increased, exceeding the limited space," said Professor WILLIAMS, further explaining the motivation behind the expansion. He recalled having seen a steady growth in the number of marine biologists joining the University over the years, as people began recognising the emerging role of Hong Kong in marine science in Asia.

Another factor for SWIMS expansion is the incredibly swift developments taking place in Greater China. "The Swire Group also simultaneously funded the development of our sister marine laboratory in Xiamen – I think they saw it as important that the two developments take place at the same time, building towards a common goal of marine conservation," Professor WILLIAMS added. Indeed, as China further develops its coastal regions as part of its grand plan, reclaiming land and building bridges, the threat to biodiversity increases. As one of the leading marine research institutes in the region,

SWIMS is dedicated to protecting and sustaining the coastal marine ecosystem, as well as investigating the impacts made by development and finding solutions for mitigation, so as to achieve sustainable development.





New Experiences

To achieve this, new outreach plans have been devised with the opening of a seminar room and biodiversity centre. **"We will have** facilities where we can hold seminars and workshops for students; and after that we can go downstairs to the centre, where we can interact with living organisms in the aquarium, as well as access the museum collections and on-line resources," said Professor WILLIAMS. Discussions with the government are also in place about the possibility to provide educational resources for the general public, since SWIMS is situated in a popular hiking area.

A more ambitious move is to engage local students, encouraging them to collect data and contribute to building a local database via citizen scientist programmes. "Even with the expansion, we are still too small. Instead of bringing a crowd of students to this small place, we hope to mobilise school children to go down to their local seashore, where they can collect their own data by counting key species along the shoreline, which we can help identify when they send us their data. We will then have the data consolidated, inputted into our online database, and made accessible to the general public," Professor WILLIAMS elaborated.


Future Endeavours

As a top-notch research institute in Asia, the expansion of SWIMS will certainly cater to the growing needs of researchers. One of these is the establishment of a new molecular biology laboratory. In the past, ecological studies mainly consisted of field-based work, be they observation or pattern-driven studies. Today, with the rapid development of molecular and multi'omics techniques, scientists can reveal the fundamental genetic and physiological changes that occur in species.

Despite the introduction of new methods, the old techniques are far from irrelevant in a modern research setting. **"We still maintain a lot of our traditional work, since we need to know the patterns before we can understand the processes,"** added Professor WILLIAMS, before sharing an experience he had when studying a species of a heatresistant snail. Through field studies, Professor WILLIAMS's team recorded snail behaviour that helped cool them down. However, observation alone could not adequately explain how the snails could withstand temperatures of up to 60°C. By studying the snail's physiology and genetics, Professor WILLIAMS, in collaboration with a number of international scientists, identified the presence of heat-tolerant enzymes and mechanisms that allowed the snails to slow down their metabolism. The findings were then used to generate models explaining the strategies organisms might employ to survive in the ever-warming environment. **"It is the combination of field and laboratory work – a speciality of SWIMS – that enables us to achieve this. We have an excellent grounding in ecology, based on field observations and experiments, and now these will be backed up**

by modern molecular techniques," explained Professor WILLIAMS.

The opening of the new lab coincides with a number of ongoing local and global projects, which offer many exciting opportunities for further collaboration between organisations around the world. One of these projects is MarineGEO, headed by the Smithsonian Institution in the US and coordinated at SWIMS by Dr David BAKER. The project aims to measure and compare the biodiversity from different parts of the world, including Southeast Asia, using a standard protocol. Locally, there is also the Ting Kok+ project, which aims to document and help conserve the biodiversity of the extensively developed Tolo Harbour. Links have also been established with prominent institutions in the Pan-Pearl River Delta region, such as the South China Sea Institute of Oceanography and Xiamen University. Together, these projects bring insight from leading researchers around the world to solve imminent problems related to marine conservation – putting a global perspective on local struggles with the loss of biodiversity; or as Professor WILLIAMS would put it: "finding local solutions to global issues".

In line with the University's vision of interdisciplinarity, SWIMS anticipates further collaborations across a diverse range of disciplines. Indeed, the aforementioned projects have already incorporated elements of interdisciplinary partnership - many of the goals could not have been achieved without the help of other departments. For example, the World Harbour Project, led by Professor Kenneth Mei Yee LEUNG, investigates the impact of development on coasts around the world, and devises management plans for the sustainable development of urban ports and harbours. Such plans rely on teamwork among marine ecologists, engineers, and architects to design coastal infrastructures, such as ecologically engineered seawalls that not only protect the shoreline but also enhance marine biodiversity, provide ecosystem services (e.g., bio-filtration), and promote a "waterfront culture".

An Evolving Scene

As the scale of environmental conservation expands and more actors get involved, SWIMS will continue to play a pivotal role in providing a sound scientific basis for future decisions made by other stakeholders when balancing economic development with conservation management. In addition, through outreach and education, SWIMS will carry on training passionate individuals who contribute to society. The new expansion will certainly play an important part in SWIMS's continued evolution and support the discoveries, theories, and insights which SWIMS provides to help conserve and manage our rich marine biodiversity.

The earth laughs in flowers. Ralph Waldo Emerson

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OAK ANNIVERSARY CELEBRATIONS

Revisiting the Highlights of Our Happy Moments



FLOWER Blossoming and thriving in vigour

PHOTO TALKS OF CELEBRATION EVENTS

emories fade as time passes. We might not be able to recall what made us giggle or moved us throughout the year-long oak anniversary celebrations; yet, photos may help to grasp back memories, at least they can present your smiley faces to you and bring you back to the cherished moments. Let's flip through this Oak Anniversary album and revisit the highlights of our celebrations!

Oak Anniversary Opening Ceremony cum Homecoming Day

On March 9, 2019, the Opening Ceremony cum Homecoming Day marked the commencement of a host of year-long celebration activities for Oak Anniversary. The event was attended by more than 200 alumni, friends and members of HKU Science family.

There were fun-filled games, exhibits and campus tours; alumni and friends also took this precious opportunity to gather on campus mingling with old peers, savouring fond memories, reviewing our milestones and envisaging our future.

To add meaning to the Oak Anniversary, we also invited our guests to witness the momentous planting of our anniversary champion's oak – a chosen gift for 80th anniversary that symbolises the growth of our wisdom and knowledge for the years ahead.



(from the left) Dean of Science Professor Matthew EVANS, President Professor Xiang ZHANG, Vice-President Professor Andy HOR and Associate Dean of Science Professor Billy CHOW officiated the opening ceremony



The President Professor Xiang ZHANG (left) and Dean of Science Professor Matthew EVANS planting the oak tree for the Faculty of Science 80th Anniversary



Distinguished alumni and guests witnessing the planting of the oak tree



The HKU Science family



Guests toasting on this happy occasion





The Way of Life: Beliefs and Values 「生活之道:價值與能量」 *Mr Chiu Ying LAM*



Get Inspired by Pioneered Leaders 「和領袖對談 構建大思維」



Carry Forward the Cause and Forge Ahead into the Future 「把握機遇 承先啟後」



Dialogue Sessions with Distinguished Alumni

Mr Wing Luk CHAN

Three dialogue sessions were held from February to April 2019, at which our Distinguished Alumni Dr Patrick Sun Cheong POON, Mr Chiu Ying LAM and Mr Wing Luk CHAN demonstrated their passion and dedication to their professions, advancement of university education and betterment of society. They inspired us, via the dialogues, to utilise our knowledge and scientific mindset to explore our own paths and to serve the community with a kind heart.

Lung Fu Shan Eco-Tour

The tour, co-organised with Lung Fu Shan Environmental Education Centre on May 25, 2019, served as a fresh break for our alumni and friends amidst their hectic schedule. The tour and seed bookmark DIY workshop inspired us not only to see mother nature, but to truly observe and appreciate her amazing beauty. The magical wonders of natural habitat also reminded the



alumni to slow down and admire the living creatures around them, and to be curious as we have so much to learn about nature.



Guided tour about biodiversity and historical sites

East Africa Wildlife Eco-Tour

The Great Migration in the legendary Masai Mara in Kenya is considered to be one of the most spectacular natural events ever. This East Africa Wildlife Eco-Tour, curated and guided by Dr Billy HAU of School of Biological Sciences and co-presented by HKU Foundation, brought our alumni and students to Kenya on July 13–26, 2019, witnessing the Great Migration, as well as the breathtaking views of Mount Kilimanjaro in Amboseli and

> more. Selected students were paired up with alumni and took up the role as eco-leaders of alumni. A photo exhibition showcasing the breathtaking scenery and precious captures in this trip via the lens

of student eco-leaders was held in September.

CARCULTY OF SCIENCE

145





Oak Anniversary Gala Dinner

The Oak Anniversary Gala Dinner, originally scheduled on November 17, 2019, is supposed to be the pinnacle of our yearlong celebrations, gathering around 840 members of the Faculty and friends to connect with generations of alumni of the same root. It is a shame that the dinner was subsequently cancelled due to the fluid situation in Hong Kong, and we were not able to reminisce the good old days and share the conviviality, yet our hearts are never far from the HKU Science Family. We hope we can catch up again with our alumni and friends in the future.

LET US BE SEEN

Anniversary Decoration and Banner at Campus



Anniversary Theme Wall at Faculty Office

A donor tree is set up at the Faculty Office for the "Grow Our Oak Campaign"





Sponsored Advertisement



AWARD-WINNING WEBSITE OF HKU SCIENCE





n light of the Faculty Oak Anniversary, the new Faculty of Science website was launched in January 2019. This new face made a hattrick for its debut – it received awards at 3 leading international website assessment exercises, including the "Award of Distinction" at the 25th Annual Communicator Awards, "University Standard of Excellence" award at the WebAward 2019 and "Silver Award" at W³ 2019, for its creativity, high quality, as well as excellence in marketing and communications. The website was also recognised as a "Friendly Website" under the Web Accessibility Recognition Scheme (2018/19).

The new website aims to present a fresh look with a global and international image, simultaneously serving as a userfriendly gateway for prospective students, researchers, alumni and the public to better understand our visions and commitment in teaching, research and knowledge exchange. With clearer presentation and concise content, this magazine-like webpage brings a better experience for users browsing the Faculty website, making it accessible for all.

Link of website: https://www.scifac.hku.hk/

HKU SCIENCE OAK ANNIVERSARY SOUVENIRS

ouvenirs are physical objects that carry memories.The souvenirs below are designed to mark this joyful anniversary year.

Premium Sunglasses

Designed by internationally renowned sunglasses designer Mr Simon CHIM, the fashionable high-end sunglasses incorporate elements of HKU Science and Oak Anniversary, making them to suit every occasion! They do not only symbolise our spirit, the oak logo embedded on the hinge also links to our anniversary motto "Science Founds Sapientia; Oak Sprouts Virtus" (明德於櫟;格物以理). We hope with its towering noble strength, the Faculty can grow as vibrant as the Oak tree and scale new heights ahead.

Steel Tumbler

Tote Bag

Acknowledgements Designer: Mr Simon CHIM – Simon Says Concepts Ltd. Sponsors: Carl Zeiss Vision Sunlers Asia Pacific Ltd. (Mr Isaac T C WONG [BSc 1986] and Mr Jackel LI), PVT Optical Ltd. (Ms Wing Ching LAU [BSc 1997]), OBE (H.K.) Ltd., and Lombra Group Anniversary motto author: Mr Isaac T C WONG (BSc 1986) Calligrapher: Dr Ambrose Shu Fai SO (BSc1973) Temporary Tattoo Sticker



Copper Pin & Keychain

You can't build a great building on a weak foundation. You must have a solid foundation if you're going to have a strong superstructure.

Gordon B Hinckley

OUR GRATITUDE GOES TO

The Backbone that Supports Everything

FOUNDATION Solid support from stakeholders

ACKNOWLEDGEMENTS

Oak Anniversary is an auspicious occasion to celebrate, review our milestones and envisage our bright future. All these would not be realised without the collective effort of HKU Science family and friends. We would like to express our heartfelt gratitude to our generous donors and dedicated Steering Committee members and all other contributors, for supporting us selflessly and empowering us to grow further in the next 80 years.



Chairperson of Oak Anniversary **Organising Committee**

Professor Billy Kwok Chong CHOW

Steering Committee

Professor Patrick Yiu Chung CHENG Professor Allan Shi Chung CHEUNG Dr Timpson Shui Ming CHUNG Professor Frederick Wing Huen HO Mr Chiu Ying LAM Dr Patrick Sun Cheong POON Dr Ambrose Shu Fai SO Dr Winnie Shuk Ming TANG Mr Sik Yan TSE Mr Kai Man WONG Dr Leo WONG Professor Vivian Wing Wah YAM Professor Enoch Chien Ming YOUNG

Alumni Engagement, Networking & Fundraising Sub-Committee

Dr Fun Ting CHAN Mr Hon Man CHAN Mr Anthony Wai Man CHEUNG Ms Jing FENG Mr Timothy HASSAN Ms Aster Chung See HO Ms Elaine Hoi Yee KWAN Ms Tiffany Sau Mei LAU Ms Ada May Kuen LAW Mr Chun Hung LEE Ms Cynthia Suk Ping LEE

Dr Jetty LEE Mr John LEE Ms Kav Kin Ha LEUNG Mr Shiu Keung LEUNG Mr Harrison Kin Cheung Ll Dr Francis Chi Chung LING Mr Shu Wing MAK Ms Christina NG Dr Chun Wai NG Ms Jenny NG Dr Seved Abdolreza SADJADI Mr Christopher Chi Hang SHAM Mr Hing Sing TANG Mr Isaac Tak Chi WONG Dr Leo WONG Mr Robert Yao Wing WONG

Community & Outreach Projects Sub-Committee

Dr Ho Yu AU-YEUNG Ms Caroline Christina Pui Sze CHAN Mr Walter King Lung CHAN Ms Cathy CHING Ms Ka Lo CHIU Mr Ian Wai Nung CHU Ms Betty Kam Lui FU Ms Samantha HO Ms Kin Yan KIU Ms Ming Wai KWOK Ms Helen LAM Mr Wai Him LAM Dr Ka Ho LAW



Publication, Homecoming Activities, Anniversary Dinner Sub-Committee

Ms Camila CHAN Dr Fun Ting CHAN Ms Elaine Yuen Ling CHEUNG Ms Ka Lo CHIU Mr Ian Wai Nung CHU Mr John LEE Dr Man Hoi LEE Ms Ting Ting LI Dr Rachel Ka Wai LUI Ms Christina NG Ms Ting Ting NGAN Mr Hok Sum PUN Ms Catherine SAM Mr Chris TAM Mr Yun Tak TSO Mr Tik Lung WONG Dr Philip Leung Ho YU Mrs Siu Hing YU CHAN



Ms Naussica LAU

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